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WHOLE No. 3116

NEW YORK, SATURDAY, NOVEMBER 24, 1917

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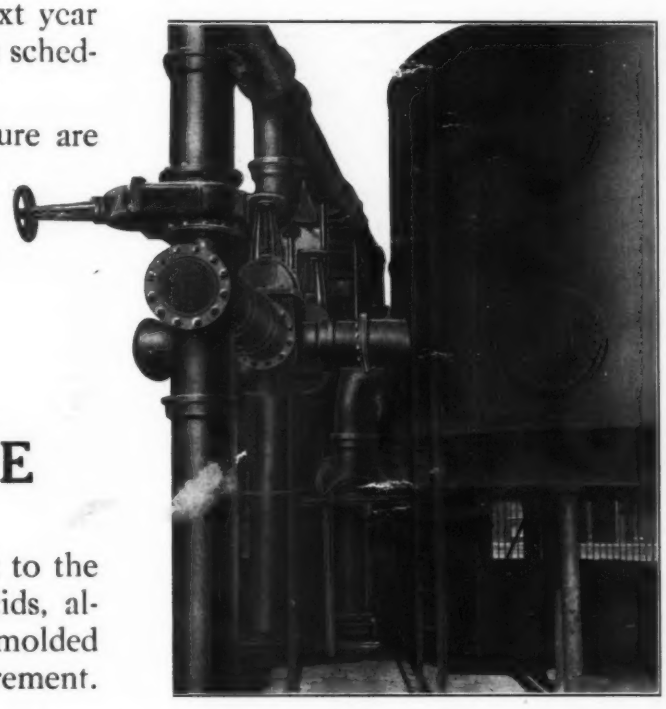

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The Use of Ovens in Lacquering, Tin Plate Decorating and Similar Purposes

Lacquering Razor Strop Parts—Coating Shell Fuses—Not a Baking Process—Importance of Tin Plate Decorating Business

By GILBERT C. SHADWELL

Lacquer is, in effect, a modification of varnish. It differs, however, in the fact that the constituents are not the same, although similar results are produced by the use of either.

Materials are lacquered in order to protect the surface from rust or corrosion or to give an added luster to the goods.

Lacquer usually consists of a form of cellulose dissolved in amyl alcohol to which shellac is added. Shellac comes in a range of colors from straw yellow to deep orange. Other colors can be obtained by the use of a dye being added. The lacquer is applied either by the spray method, by dipping, brushing or by rolling.

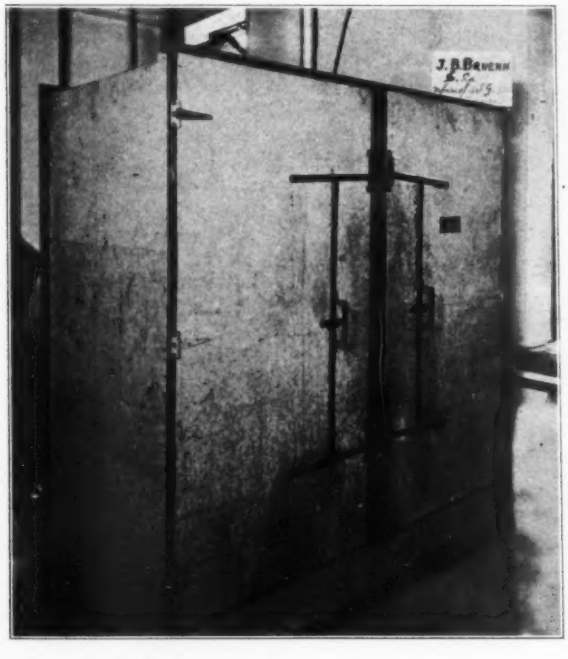


FIG. 1—A TYPICAL LACQUER OVEN WHICH IS SIMILAR TO A JAPANNING OVEN, EXCEPT FOR THE INSULATION

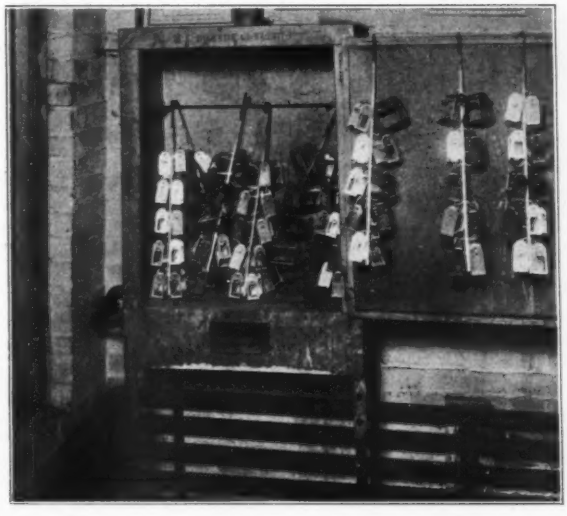


FIG. 2—SHOWING METHOD OF STACKING ARTICLES

The lacquer is dried generally by means of the articles being placed in a lacquer oven at a temperature from 120 deg. Fahr. to 300 deg. Fahr., depending on the nature of the lacquer. A lacquer oven is similar to a japan oven, but usually need not be so heavily insulated, due to the lower temperature needed, and almost always can be direct-fired, as there are seldom any inflammable vapors given off.

A typical oven for this purpose is shown in Fig. 1, the method of stacking the articles being shown in Fig. 2. This latter illustration shows the baking of goods with which almost everyone is familiar—namely, gas domes.

Process Does Not Involve Baking

Lacquering, however, does not, strictly speaking, usually involve actual baking. It is (except when real

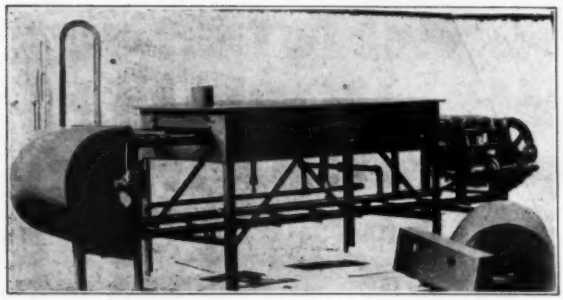


FIG. 3—OVEN FOR COATING SHELL FUSES, SHOWING WORM GEARS, MOTOR AND CONVEYOR

"baking" lacquers are used) only a drying process. It is for this reason that a temperature of only about 150 deg. Fahr. is all that is necessary.

It is important, however, that a lacquer drying oven be well ventilated. The vapors given off must have free exit, but this does not mean that there should be over-ventilation which would cause the heat to be wasted.

The lacquering of razor strop parts is typical. But little insulation is employed in the oven used in this work, as only a very low temperature is needed, but sufficient ventilation is provided for accomplishing the drying necessary.

Utilizing Waste Heat

An air heater can be used in conjunction with special ovens to excellent advantage and the used air can be passed on to another oven in order to use any waste heat available before being discharged. This method is particularly applicable for both low and high temperature work.

It is even more desirable to recirculate the heated air. This can be accomplished by means of a three-way damper.

So far we have only considered stationary ovens. However, those of the conveyor type need particular attention, due to their popularity for certain classes of work.

Coating Shell Fuses

Fig. 3 shows an oven of this type. The conveyor is operated by means of a motor attached to one end geared by a worm gearing to the main conveyor. This particular oven was designed for coating shell fuses with a special kind of varnish or lacquer. The fuses are placed on one end of the conveyor and travel slowly through the oven. When they emerge at the other end they are coated by means of a varnish brush and, being hot, they dry very quickly.

A separate design of conveyor oven, however, is generally necessary for each class of work to be handled.

Whatever articles are lacquered it is very important that all of a kind shall be of a uniform color. This is difficult to accomplish, unless the temperature is uniform. Such points are particularly important when the lacquering of tin plate is undertaken. The tin plate decorating industry is now a very large one.

Tobacco and other tins, which consist of tinned sheet iron, are lacquered and put in a lacquer drying oven. They are then sometimes lithographed and then again put into the lacquer oven.

Each color of the lithograph or each lacquer coating generally requires a separate bake in the oven.

Some lithograph colors, especially the reds and blues, are liable to appear in final form in a great variety of tints if improperly baked.

This is a matter which every tin plate decorating manufacturer desires to avoid. It can be avoided if uniformity of heat be observed and maintained throughout the oven.

If pipe burners with baffles are placed at both ends of the oven as well as between the rolling racks, it will

FIG. 4—RADIATOR TYPE OVEN OFTEN QUITE FEASIBLE IN PLACE OF OVEN SHOWN IN FIG 3

be found that such a method has a great tendency to produce evenness of temperature.

It is possible to run the racks three or four deep, and satisfactory results can still be obtained by spacing the burners in this way.

It is essential that there be a damper in every flue pipe. Some users prefer to leave the dampers wide open for the first ten or fifteen minutes in order to allow the vapors to escape, and then to practically close them up so as to retain all the heat possible up to the desired temperature, and so as to give proper uniformity of temperature throughout the oven. Where more than one flue is installed there should be a separate damper on each flue. In the writer's opinion it is not usually necessary to open the flues at all. It is generally sufficient to adjust them so that as little heat as possible escapes, and then to leave them set for all time.

Of course, when indirect heat is used there will be flues for the radiators and flues from the oven proper. All of these should have separate dampers and be properly regulated to get the best results. In place of using pipe burners with baffles for direct-heated ovens, it is quite feasible to use direct radiators of the type shown in Fig. 4. It is claimed by some users that better results are obtained by their use, although this is problematical.

In tin plate decorating the average size of rack used that is mounted on wheels is 26 x 48 x 70 in. high. Such a rack is usually made to hold a box of tin plate. These sheets of tin plate vary in size, but usually average about 120 sheets to the box.

In the case of lacquering other goods they are usually

cleaned by being pickled in a weak acid solution, dipped in a cauldron furnace filled with water, and finally placed in a sawdust box.

The function of this latter appliance is to provide heated sawdust which will absorb any surplus moisture from the brass or other parts previous to their being lacquered. This insures a lasting effect from the lacquer and tends to prevent any corrosive action as well as providing a clean, bright finish.

It is usually quite satisfactory to heat such sawdust drying boxes directly, but steam is occasionally employed, although danger from fire is very remote.

The best proposition, however, if the customer will stand for the expense, is a water-jacketed box.

The lacquering business is big. It must not be overlooked by the gas man.

Small Minimum Charge as a Producer of Unprofitable Accounts

S. E. De Frese Declares that It Costs the Small Company from One to Two Dollars a Month to Carry Customers Who Use No Gas

I have been convinced for a good many years that public service corporations operating under a small minimum charge per month have contributed largely to the production of unprofitable customers, declares S. E. De Frese, general manager of the Chattanooga (Tenn.) Gas Company, in a paper prepared for the 1917 convention of the National Commercial Gas Association. This matter has received very little attention in the past by gas companies, and while all of us have realized that we cannot serve a customer for 25 or 50 cents per month, at the same time there have been, and perhaps are now, gas companies that make even smaller minimum service charges per month.

Fallacy of Antiquated Beliefs

Investigation of this subject will develop that it costs the small gas company from $1 to $2 per month where no gas at all is furnished, but where the company stands ready to deliver service. In the larger cities this expense will be reduced by reason of the number of customers the company has on its books, but there will scarcely be found an instance where the small charge of 25 cents will cover the ready-to-serve expense of an individual customer.

Viewed from the Wrong Angle

In the past it has been reckoned that, gas companies being monopolistic in their character, a customer making application for gas would certainly use at all times more than the monthly charge represented. It appears to me that for this reason gas companies have proceeded to follow their predecessars who believed in the small minimum charge.

The average customer who pays the minimum charge per month where no gas is used in his home will tell you that the amount paid represents a magnificent return to the gas company as rent on the meter. He has been educated to believe this and he knows no better. Had he been educated to believe that he had to return to the company his portion of their overhead or readiness-to-serve expenses, he would have been just as happy, and the company would have been eventually better off. It is a question in my mind whether this gas customer would not have been more easily developed into a profitable customer than the one who is now paying a small minimum charge.

There is another unprofitable feature of our business, and that is that we render to the customer in most cases an amount of gas equal to the money he pays us. In other words, if we are selling gas at $1 per 1,000 cu. ft. net, and the minimum charge is 25 cents, then the customer is entitled to 250 ft.

There is very little he can do with such a small amount of gas, whereas if the minimum charge were $1.50—a figure perhaps much nearer the actual overhead expense incurred—he would have at his command 1,500 cu. ft. of gas, and I believe he would come nearer using this amount than he would the 250 cu. ft.

Educating Him to View It from the Personal Angle

I trust that I shall not be misunderstood in this matter, for I do not want to convey the impression that the customer should receive 1,500 cu. ft. of gas for his $1.50, if the overhead expense in carrying this customer is $1.50. In this instance the loss would be the difference between the actual overhead expense and the cost of manufacturing 1,500 cu. ft. of gas. Assuming the manufacturing cost at 20 cents per thousand, we would have a loss on this customer of 30 cents, and this goes to show that the quantity allowed the customer until his overhead expense is paid should be less or should be sold to him at a higher rate.

My investigation of this subject convinces me that the unprofitable customer knows very little about the benefits to be derived from the use of gas. It is on this ground that we must approach him and not on the question of what he owes the gas company. The customer does not interest himself in what it cost the gas company to serve him, so long as he is not unnecessarily burdened, and an appeal to him that he is an unprofitable customer because he does not pay his just pro rata of the ready-to-serve charge would probably gain nothing.

The expense of carrying an account that represents little or no gas consumption is a condition of which we know, and it is well enough to think about it, but it certainly does little or no good to use it as an appeal to the customer.

Introduces New Element Into Handling of Complaints

The Bay State Street Railway Company has devised a way of making complaints redound to the advantage of the company. Leonard Etherington tells how to handle them in a recent article in *Printers' Ink*. "Instead of sending the complaining patron a few lifeless and formal words in reply," he states, "the company looks into the matter he complains of and writes him a real letter dealing fully with the case.

"He may be right or he may be wrong, and he probably was angry when he wrote.

"Its intention is to make him contented and, if possible, a booster for the road.

"The attitude in replying is that here is a patron who has a real or fancied grievance. He has written about it, and wants to know that his complaint has been received and that it has or will receive attention. He also wants to know the attitude of the company toward him, and he wants to know these things promptly.

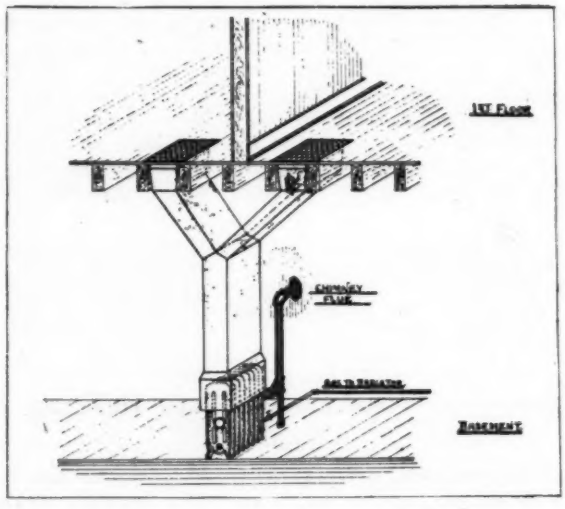
"Therefore, every complaint letter is answered the day it is received, unless an investigation is necessary that can be made quickly.

"The company always assumes that the patron is right—until he is proved wrong; and even if he is wrong it doesn't argue with him. It is more profitable to find some point on which they can agree than to point out where the writer is wrong.

"Besides writing to him, an official of the company, whenever possible to do so, makes a point of calling on him to talk the matter over in a friendly way and explain more fully the company's side of the case."

Heating Offices Where No Room for Radiators Is Available, Made Possible by Piping Arrangement

This wrinkle developed in a stationery store where two small offices were to be heated, and where space could not be spared for radiators and where the cost of radiators for each office would make the job too expensive to be accepted, writes William L. Conner for the Wrinkles Department, D. J. Young, editor, of the Pacific Coast Gas Association. As there was convenient flue



DIAGRAMMATICAL CROSS-SECTION SHOWING TWO FLOORS AND THEIR HEATING POSSIBILITIES

connection in the basement, and one radiator being capable of heating both offices, I found that an installation, such as the accompanying drawing, answered the requirements in every way.

Conditions similar to the above are found quite frequently, and while the idea is not new or original, it might be found serviceable in a great many cases.

Philadelphia Newspaper Quotes Non-Partisan Authority Against Maintenance of Candle Power Standard

It is not reasonable, but a fact nevertheless, that one paragraph in a reputable newspaper has more weight with the public in influencing judgment in regard to changes in standards than fifty pages in a journal essentially devoted to gas, and therefore, presumably, better informed as to the real facts, and page upon page of testimony on the part of an expert gas engineer. It is therefore encouraging to find in a newspaper of the character of the Philadelphia *Public Ledger* such an editorial as the following:

"Every time enriched gas is burned in a gas stove, under a boiler or in a mantle lamp, an American soldier is being deprived of explosives he needs in carrying the war into Germany. This is no exaggerated statement; it is the cold truth vouched for by no less an authority than the official journal of the American Chemical Society. It has been for years an economic blunder to burn up valuable materials in gas, but to continue that practice under war conditions is a military blunder as well.

"In a good many lines the war is likely to pound sense into the American head. Ordinarily 'illuminating' gas might be a pretty good point at which to start right now. In a good many cities there is a candlepower standard which the gas must maintain. This was all right years ago, when gas was burned raw, so to speak, and when it was being used chiefly as an illuminant. The illuminating qualities came from certain vapors which, if not actually existing in sufficient quantity in the gas as made, were introduced by a process of enriching.

"But these substances which furnish the illuminating power are the very substances which can be utilized for the production of toluol, the basis of the best and safest modern explosive, trinitrotoluol, which has been recommended for our own military use abroad. It is certain that if these materials are burned they can't be used to propel shells, and it is equally certain that there is little real reason for burning them.

"The real test for gas to-day is its heating power, and to this benzol and toluol add but a trifling amount. The use of the gas mantle is virtually universal these days, and where a mantle is used the actual illuminating power of the gas is of no consequence, since the light comes from the intensely heated fiber and not from the gas itself.

"In the face of all this the obsolete candlepower standard has continued to hold its ground, though progressive communities one after another are abolishing it and permitting the use of rich gas constituents for more useful purposes. The war may yet give the old unit of measurements its death blow all over the country, and if it does there is one more mark to its credit."

West Virginia Leading Natural Gas State

West Virginia leads all the States in the Union in the production of natural gas, according to the report of the United States Geological Survey for 1916, just made public. Not only does West Virginia lead, but the State produced more than twice as much gas in 1916 as her nearest competitor, Pennsylvania.

The proportion of natural gas supplied to industrial consumers in 1916 was 4 per cent larger than in 1915.

The Engineer a Maker of Service—the Commercial Man a Seller of the Commodity He Makes

Robert ff. Pierce Draws the Line of Demarcation Between the Two Predominating Branches of the Utility Field—How Failure to Co-operate on the Part of Either Can Affect the Other

The activities of the public utility as directly affecting the consumer are twofold—engineering and commercial—the rendering of service and persuading the consumer to purchase the service, declared Robert ff. Pierce in a paper prepared under the auspices of the National Commercial Gas Association for the correspondence convention of the Illuminating Engineering Society.

The relative scopes of engineering and commercialism have never yet been defined to the entire satisfaction of many individuals, and while the line of demarcation is at certain points indiscernible, it will be worth while to attempt, at least, a more workable and practical definition than has yet been offered.

Engineering

Engineering, as defined by Tredgold and accepted by the public in general, is the controlling of natural forces for the benefit and service of mankind. Anything which has directly to do with transforming, modifying and utilizing the heat of coal, gas or the potential energy of the waterfall for heat, light or power comes within the province of the engineer.

The manner in which the transformation should be accomplished, the form in which, and the conditions under which, the transenergy should be delivered to the consumer, and the manner in which the final product —light, heat or power—should be used by the consumer, are purely engineering problems, concerning which no one but the engineer is competent to exercise authority.

In exercising this function the engineer must co-ordinate and effect compromises among many and diverse fields of knowledge and endeavor. In the case of lighting, he must have due regard for the facts obtained and set forth by the psychologist, opthalmologist, photometist, physicist and chemist, and still observe the usages and practices which govern all activities into which economic considerations enter—legal and financial. Engineering is, after all, simply the commonsense intelligent way of weighing and balancing these factors, in order to secure the greatest ultimate common good, and existing engineering practices and methods do exist simply because they have been found the best and most effective means of securing these results.

Object of Commercial Activities

The object of commercial activities is to persuade the customer that the service provided is sufficiently desirable to justify the price asked for it and to maintain those pleasant relations between the company and the public upon which the continuous and increasing inclination of the latter to purchase the product of the former may be maintained indefinitely.

Between intelligent men who understand their limitations there can be no great conflict of opinion as to the proper spheres of engineering and commercialism. It is only when one or the other attempts to extend his jurisdiction beyond his legitimate territory that friction arises. When the engineer restricts the expansion of the business by emphasizing economy at the gas house to such an extent that the service suffers, and when the commercial man fails to exercise his positive functions as a seller of service, and retrogrades into the merely negative of an order-taker, selling merely what the consumer *thinks* he wants, the business suffers.

Differing Functions Clearly Defined

Thus the engineer is a maker of service—the commercial man a seller of service. But what is service? Does it consist solely in maintaining courtesy in the complaint department, and in dispatching a fitter by motorcycle within three minutes of a telephone call indicating a gas leak? A great many people appear to think that the essentials of service consist in just such things as these.

Service is whatever is the object of the consumer's purchase. Rendering the service with an accompaniment of promptitude and amiability does embellish the service, and these embellishments are useful and desirable accordingly, but they do not augment the value of the service to the consumer. These things are merely the garnishings and decorations of service. They make it look and, so to speak, taste better, but add little nutriment.

A tailor may use the best of cloths, the finest of linings, may employ the most courteous of salesmen and the fleetest and most resplendently uniformed of messenger boys to deliver his goods, but unless the clothes fit the purchaser, he has bought 99 per cent paprika and 1 per cent substantial service.

The service which a lighting company renders to its lighting consumers consists of good illumination—adequate, comfortable, attractive, dependable. What shall it profit the consumer if he purchase a lamp from the most affable salesman in the world, has it delivered in the speediest delivery car, and is assured instantaneous and courteous treatment of all complaints, if, after installation, the light is glaring or inadequate, or improperly distributed? He has not bought service, and got a misfit. It is quite likely that he is not sufficiently critical to appreciate the fact, but in this age of rapid dissemination of popular information, a business founded upon the ignorance of the public is, to say the best, precarious.

Illuminating Atrocities

Of course, it is quite impracticable to so effectively supervise every installation as to ensure good results in all cases, and if examples of bad lighting due to the customer's ignorance were by any means infrequent, the practice of lighting companies in this respect would, perhaps, be above criticism.

But at least 90 per cent of all artificial lighting is done in a way that reflects discredit upon the illuminant employed, upon artificial lighting in general, and yields to the user but an insignificant fraction of the service which he has a right to expect.

A large proportion of these unmitigated atrocities are installed at the suggestion and by the advice of salesmen whom it would be comparatively easy to control in the interest of the consumer's eyesight if there were any inclination to do so.

Too often so-called "commercial" considerations—which are really the intrusion of commercial factors where they do not belong—are responsible. One example, which is, perhaps, typical, will illustrate this:

Assinine Short-sightedness

Not long since a commercial manager asked the assistance of a lighting specialist in securing a contract for lighting a factory. The proprietor of the factory had become suddenly affluent through "war orders," and had expected to scrap his open gas-flame lighting and substitute electric lighting. The conditions made it necessary to use artificial light all day. The work was exacting in its nature, and the operatives suffered to some extent, at least, from the high temperatures prevailing at the machines. The proprietor stated as the most important requirements in his estimation: The reduction of heat and the furnishing of a light "easy on the eyes." Suggestions were made covering the use of a standard gas lamp with a standard factory reflector, the lamps being spaced to provide uniform illumination, and placed 12 ft. above the floor to reduce discomfort from radiant heat beneath the lamps. When this suggestion reached the commercial manager's desk it was rejected as "impractical" on the following counts:

1. He had always used "arc lamps" in factory lighting, and "guessed" they were good enough in this case.
2. He had a hundred second-hand arc lamps from a rental contract he had just lost, and it would be a crime to spend money for new lamps.
3. He did not have the recommended reflectors in stock, and didn't think reflectors were any good anyhow. At all events, the "arc lamps" had a sort of reflector attached that he "guessed" was good enough.
4. They had always hung lamps 8 ft. from the floor. The additional height would make some extra work for the trimmer, and he "guessed" it didn't make any difference anyhow.

The commercial manager installed the lamps of his own chosing according to his own ideas, *and fitted them with clear globes* (which were more "practical" it seems). Three months after the installation was thrown out because employees, complained of the "heat and glare from the lamps," and the building wired for electric light.

Conclusions Drawn from the Experience

The conclusions relating to illuminating engineering which the commercial manager drew from this incident are "illuminating" to say the least. In discussing the subject some months afterward he relieved himself of the following:

1. There was no need for special training in illumination. He could teach a salesman all the "practical" points in an hour's conversation.
2. All engineers, particularly illuminating engineers, were "impractical," and did not appreciate the necessity for "commercialism."
3. The public was so hopelessly prejudiced against gas lighting, even though it *was* better, that it couldn't be sold.

Now the attitude and the frame of mind evidenced by the foregoing are by no means ubiquitous, but they are sufficiently widespread and influential to constitute a very important—in fact, *most important*—menace to the gas-lighting industry to-day. It is safe to say that at least one-half, and probably two-thirds, of the gas lighting business which has been lost to competitive illuminants has been lost as a direct result of this attitude, and could have been retained through a more enlightened view of commercial problems.

Prophets Who Were Not Heeded

That there has not been an entire lack of prophets in the gas industry, though most of them have entirely lacked disciples, appears from some of the earlier transactions of gas associations. In 1887, E. C. Jones presented before the American Gas Light Association a paper entitled, "The Relation of Intensity of Light to Visual Perception." In this paper he said: "It may be said that the physiology of vision is not pertinent to the gas business which we are here to discuss, yet it bears the same relationship to it as it exists as that of the judge on the bench to a criminal on trial. To it we must plead our cause and on its judgment depends the success of our industry. A large proportion of the companies manufacturing gas at the present time style themselves gas light companies—that is, they morally carry the gas beyond the meter to the burner of the consumer." He also very clearly explained why it is that quantity of light and illuminating effect as appreciated by the eye are not proportional to each other.

In the same year and before the same association, A. C. Humphreys read a paper on "Illumination vs. Candle-power," which stated the fundamental physical basis for illuminating engineering. In 1899 F. N. Morton presented before the same association the results of a series of subjective estimates of various lighting conditions—indirect lighting (by gas, by the way) being among them.

In discussing this paper, N. W. Gifford said: "Until recently, perhaps, after we had made our gas we thought there was nothing further for us to do but to let our customers get the benefit from it. It seems to me it is a step in the right direction to tell our customers how they can get the best effects from the light we are selling them."

F. B. Wheeler said: "These problems of interior illumination are the most important that gas engineers have." He also called attention to some work which represented the beginnings of illuminating engineering in Germany, and cites an editorial in the *Engineering Magazine* calling gas and electrical engineers to task for their neglect of this field.

Three Obstacles in the Way of Real Service

These incidents are cited to show that illuminating engineering far from being a mushroom upstart possesses

all the dignities and prestige which are tributary to age. The estimation in which it has been held by some of the most prominent men in the industry, as witnessed above, entitle it to the most careful consideration.

There are three obstacles in the way of gas companies who wish to give real lighting service through the medium of applied illuminating engineering.

The first is the widespread opinion among commercial men that engineering is an activity circumscribed by test tubes, precision instruments, curves and mathematical formulæ, and having no relation whatever to the practical application of gas.

The second is the knowledge that the gratuitous offering of an illuminating engineering service in connection with the service of gas would entail at least some additional expense, not directly recoverable from the consumer nor obviously compensated for by saving in some other direction.

The third is the fear, based upon nothing in particular, that such an innovation would be "unpractical"—whatever that may mean.

Utilizing Engineering to Its Fullest Extent

It is difficult to understand how the first attitude of mind can exist in this age of scientific progress. Practically all of our modern advancement in all that makes for material welfare is the direct result of an increasing application of scientific facts and methods to commerce and industry, and the governing of these activities in conformity with engineering practice. If the object of the public utility be "public service," it is difficult to see how engineering, which is the practical way of determining and rendering service, should not be utilized to the fullest extent.

The fear that the improvement of lighting service by the application of illuminating engineering might fail to be ultimately profitable is even less comprehensible.

The gas company is not a philanthropic institution, and the value of illuminating engineering to the gas industry obviously rests upon the importance of the gas lighting business.

There has been a disposition in some quarters to minimize the importance of this department, and to view the fuel field as the most promising subject for exploitation. Not a few individuals are of the opinion that it is best to abandon, or at least to lose by default, a business which energy and combativeness are required to hold in the face of competition, and to devote all sales activities to fields in which competition of an effective sort does not and personally cannot exist.

There is no gainsaying the truth of the adage that "He who fights and runs away will live to fight another day," and the easiest path doubtless lies in the avoidance of competition, with its accompanying financial and mental strife, and the seeking of virgin fields from which our electrical friends are fenced out by a high, if not insurmountable, barrier.

Comparative Estimates

The gas-lighting business is, however, so inextricably connected with the domestic fuel business that it is doubtful if a separation of the two may be effected without calamitous results. At the present time it is roughly estimated that 30 per cent of the artificial gas sold is used for illumination, 50 per cent for domestic fuel and 20 per cent for industrial fuel.

These estimates are not based upon actual measurements, nor upon comparisons or calculations having a valid and substantial basis, and must be taken as including a certain modicum of personal predilection.

Undoubtedly many gas companies which have received rather rough handling in lighting competition would like to believe that this business is of small consequence anyhow, and this inclination colors the estimates to a certain extent.

Statistics of lamp and mantle manufactures indicate that the estimates for gas used for lighting are to say the least extremely conservative and probably much too low. From rough approximation 33 1/3 per cent will be a satisfactory figure and one that will not err in the direction of liberality.

What may for lack of better designation be called the typical good domestic gas consumer, purchases annually, say, 35 M. cu. ft. of gas at $1 per M. cu. ft., the gas company's revenue being, therefore, $35.

The cost of serving this customer may be divided as follows:

1. General Cost.—	Expenses and disbursements which are independent of the number of customers or of the amount of gas consumed.	
	(a) Int. and dividends....$2.98	
	(b) Operating expense.... 6.15	
		$9.13
2. Customer Cost.—	Expenses and disbursements which are proportional to the number of customers, but independent of the amounts of gas consumed.	
	(a) Int. and dividends....$3.76	
	(b) Operating expense.... 3.55	
		$7.31
3. Demand Cost.—	Expenses and disbursements which are proportional to the maximum rate at which the customer may consume gas, but independent of the total amount consumed per year (estimated on the basis of 22 cu. ft. per hour, maximum one hour demand).	
	(a) Int. and dividends....$5.24	
	(b) Operating expense.... 4.57	
		$9.81
4. Service Cost.—	Expenses and disbursements depending upon the amount of gas consumed yearly.	
	(a) Gross cost of gas-making materials, less credit from residuals, plus manufacturing, labor, maintenance and distribution expense.	
	$0.25 per cut. ft.....	$8.75
	Total	$35.00

The above illustration is that of a consumer very near the ideal (from a revenue producing standpoint) among small domestic consumers. Any customer who, with the same maximum demand takes a smaller amount of gas per year, or taking the same amount per year, demands gas at a quarter maximum hourly rate, is not only unprofitable, but is served at a loss which must be made up by an excessive charge upon customers of a more profitable sort.

If the above customer discontinues his gas lighting, the company's revenue (at $1 per cubic foot) is reduced to $20.42, and its expenditures, classified as before, appear below:

1	$9.13
2	7.31
3	5.82
4	5.10
Total	$27.36
Revenue	20.42
Net loss	$6.94

It is obvious that this relation between domestic fuel and lighting holds whether the customer is actual or prospective. The gas consumption of the average domestic consumer is insufficient to enable the gas company to make a profit unless his service includes gas for lighting.

Method of Arriving at Figures

In order to forestall criticism based upon a misunderstanding of the importance of some of the factors involved, it may be well to explain that in allocating the fixed charges and expenses incurred on account of maximum demand, the individual maxima have been regarded as coincident because no information is available concerning the magnitude of diversity factors in the service of gas. A personal opinion might be hazarded to the effect that these factors are somewhat smaller than in electric service on account of the lesser proportion of services in apartment houses and dwellings of the more pretentious sort, the occupants of which are more likely to be of irregular habits, than those of houses and tenements occupied by working people, whose hours for meals and recreation are quite rigidly fixed by their condition of employment.

A maximum demand of 22 cu. ft. per hour has been selected, not as being an average, but as representing a particularly good condition and one which showed net earnings (in dividends) on the service of the customer. As a matter of fact, a consumer of 35,000 cu. ft. per annum, with a maximum demand of 22 cu. ft. per hour, would, like the impossible hero of the Sunday school book, be quite too good to be true, and certain to meet with the inevitable reward of excessive virtue—an early grave.

At all events, the demand charges in the first instance comprise but about 35 per cent of the non-proportional charges and about 26 per cent of the second, so that general and customary costs, into which the demand does not enter, are of much greater significance.

All that it is here desired to show is what is perfectly obvious, and for that reason seldom realized—that in the operation of a public utility at a fixed and inflexible rate for energy there is a certain point in demand and consumption at which profit ceases and loss begins, and that in any class of business which, so to speak, "floats" about this point, the retention of the most highly-competitive service is of the greatest importance. The relatively non-competitive business may be regarded as comparatively fixed. It is the easily detached revenue which determines the solidity or precariousness of the business of a given customer.

To an engineer the following set of propositions appear not only individually indisputable, but leading to a logically inescapable conclusion:

1. The retention and development of lighting business is essential to the well being of the gas industry.
2. The lighting business will not and cannot be retained or developed unless lighting service of a creditable sort is rendered with gas.
3. Creditable gas lighting service cannot be rendered to the public without the full and complete application of illuminating engineering principles and practices.

Commerce by Necessity Conservative

The timidity with which an innovation involving the modification of existing commercial practices is approached is more easily understood. Commercial practice is an uncharted sea. The engineer may predetermine the results of his practices to a high degree of accuracy. Having a light source giving 100 candlepower in a given direction, he knows that he may obtain an illumination of 1 foot-candle at a distance of 10 ft. in that direction. He does not need to make the actual experiment to vindicate the accuracy of his judgment, at least to any intelligent person. He has a firm basis of fundamental principles and definite laws expressing invariable relations, which make absolute certainty a possibility.

The business man is not so favorably situated. There are no fundamental facts or laws of commerce.

No commercial man can tell within limits of accuracy much larger than those obtainable in engineering calculations, the percentage of increase in sales which may be obtained by decreasing the price of an article by a given per cent, or by expending a given amount of money in advertising or in improvement of service.

What he does know is that he will be blamed for any decrease of profits which *may follow* (*not* necessarily *result from*) any action which he may take. It is this incalculable hazard which makes business above all things conservative. "A bird in the hand is worth two in the bush," and prospective business is always very much of a bird in the bush.

Requirements for Sales

But the application of sound principles to the sale of lighting involves neither great expenditures nor radical change of policy or practice. It requires only recognition of the following requirements and a reasonable effort to meet them:

First—Each customer should receive, within reasonable limits, the sort of service best suited to his needs, including proper selection and arrangement of lamps and reflectors with reference to hygienic, comfortable, adequate and economical illumination.

Second—The gas company should require that all salesmen be competent to advise the consumer correctly, and honestly willing to do so, regarding the equipment best suited to his needs, and the method of installation; or provide effective means for so supervising the activities of salesmen, through competent specialists, as to guard against at least the more flagrant violations of good lighting practice.

No company which honestly wishes to render reasonably good service can object to the general proposition that the first requirement should be met, nor is it likely

SHOWING WHERE MAIN WAS CUT AND PLUGGGED—BENCHES MAY BE SEEN BACK OF EACH BELL

that a more practical way of accomplishing this than is set forth in the second will be found. Nothing is more certain than that the consumer who is left to his own devices, or abandoned to the mercies of a salesman who lacks special knowledge of lighting, will almost inevitably find himself burdened with an extravagant, poorly designed, harmful and generally disreputable system of illumination.

Training Salesmen

The effective way of abolishing this condition is, of course, to train the salesman. If he has the qualifications usually regarded as desirable, he will have no objection to selling the sort of equipment which will render the best services to the customer.

If the salesmen are not inclined to show interest in the matter, and the company feels doubts about its ability to get along without them, it has the alternative of obtaining a special "lighting man" for the general supervision of the salesmen's practices in recommending equipment, and for special duty in handling particularly important installations.

Several central stations and gas companies have tried the latter plan. In every case the results have entirely justified the innovation. Business heretofore regarded as hopeless has been retained and obtained. A general improvement in the tone and vigor of the lighting business has been noticeable.

But thus far there has been no company (at least among gas undertakings) willing to display the courage of its convictions and require that every salesman of lighting appliances shall know how lighting appliances should be used. The promptitude and extent to which this idea of the salesman's responsibility is accepted and put into practice among gas companies will largely determine the future position of gas lighting and the domestic gas business.

Benches Back of Bells Hold Up Gas Main While Preparations for Lowering are Being Completed

Main Allowed to Settle Down to New Level By Gradually Digging Out Earth Beneath It—Safety Measures Adopted

By JOSEPH LUCENA

Superintendent of Distribution, Omaha Gas Company, Omaha, Neb.

The 8-in. intermediate pressure main supplying gas to that section of Omaha known as Benson was exposed by grading operations for the construction of a new boulevard at Forty-eighth Street, between Seward and Decatur Streets, making it necessary to lower the main for a distance of 450 ft.

As no other supply line runs to Benson, a 4-in. bypass was used. Four 2-in. holes were made at each end of the job so as to furnish the proper facilities for cutting off the gas in the section of main to be lowered. The ditch was dug to the required depth (about 7 ft. at the maximum), leaving a bench of earth back of each bell to support the main until preparations were completed for lowering.

PIPE LOWERED BY GRADUALLY DIGGING AWAY EARTH BENCHES

Everything being ready, including bell holes, a workman equipped with a self-rescue breathing apparatus placed two stoppers, one in each of the 2-in. bag holes, against the flow of gas. Vent pipes, consisting of 20-ft. lengths of 2-in. pipe, were placed in the third 2-in. holes, and two bags were placed in each of the last 2-in. holes. This part of the work was undertaken the first thing in the morning, allowing a full day to lower the main.

The pressure in the main varied from 20 to 50-in. water pressure, and the flow of gas in the section worked on was completely stopped, as described.

As soon as this was accomplished, a short piece of the main was cut from the center of the section with wheel cutters, plugs were placed in the open ends, and the lowering proceeded with in the regular way. The first joints at each end were cut out and the earth gradually and evenly removed from the benches, allowing the main to settle to its new level.

The south half was first lowered and graded with a level, followed by the lowering of the north half in the same manner.

The main was reconnected and gas flow resumed the same day. The joints were of cement, faced with lead wool, and, after lowering, these were recalked and tested.

How the Gas Companies are Helping the Nation

THE COUNTIES GAS & ELECTRIC COMPANY, of Norristown, Pa., at its recent monthly meeting of the employees there was given a big boost for the Liberty Loan campaign, and at the close subscriptions to the amount of $6,000 were placed. After congratulating the employees upon the success of the event, H. H. Ganser, superintendent of the company, spoke of the Liberty Loan campaign, and when he had completed his appeal for subscriptions those present came forth, pledging the above amount within a few moments.

JOHN R. BAKER, formerly engineer with the Fall River Gas Works Company, of Fall River, Mass., is now in the service of the U. S. Navy, ranking as ensign and at present stationed at Annapolis, Md.

THE CITIZENS GAS COMPANY, of Indianapolis, Ind., recently hung out a service flag, showing forty-four stars in the white field, indicating the number of employees now in the army and navy. This represents about 5 per cent of the entire force of male employees of the company and a number of others are expecting to enter the service. The men from the gas company have gone into all arms of service. Nineteen are in the infantry, appearing in the Regular Army, the National Guard and the National Army. Two have entered the ordnance service, two the Coast Artillery, four the Field Artillery, three the Aviation Corps, three the Engineers, one the Signal Service, three the Ambulance Corps, one the Marine Corps, five the Navy and one the Servian Army, now in southern France. Three of these are commissioned officers and six are non-commissioned officers. The men from the gas company are scattered among the various posts in this country and a number are with the American expeditionary force in France.

THE NEW BEDFORD GAS & ELECTRIC LIGHT COMPANY, serving gas to New Bedford, Mass., have now twenty-six employees in the service of the United States. These men receive military pay and the New Bedford company makes up any deficit there may be from the wages while in its employ. The men in the service are as follows:

John Barry
Milton Abrams Baylies
J. Octave Berube, Company C, Camp Devens.
Robert F. Bunnell
M. J. Connolly, training regiment, Cloyne Field Barracks, Newport
Clifford Cormier, Company E, First Regiment, Washington, D. C.
Harold J. Cotter, Newport
Irving Davids
John Sledden Dawson
Henry Dubois
Harry S. Grover, Naval Reserve
John J. Harrington, Fort Slocum
Sidney Lees
Adelard Leger, Company 8, First Regiment, U. S. Engineers, Washington Barracks.
Christian N. Leuchenring, Fourth Aero Squadron, Aviation Field 2, Hempstead, L. I.
Charles Marks, Aero Squadron 57, Camp Kelly, San Antonio
James A. X. McCauley
Audell W. Monk, Jr.
Arthur J. Murnin
Carl Mattson
Joseph Ogden, U. S. S. Mt. Vernon
Carlton W. Smith
Hector Eugene Suprenant
Edward F. Sweeney
John Starkis
T. W. Williamson

ROBERT L. LONG, former engineer with the Union Gas & Electric Company, of Cincinnati, Ohio, demonstrates the possibilities of rapid promotion in the new National Army by the following anecdote: He enlisted Oct. 9 in the regular army and was transferred to the selective force. On Oct. 20 he was assigned to the headquarters company. For a day he was Private Robert L. Long. On Oct. 21 he was made corporal. Next day he was made sergeant, and four days later he became battalion sergeant-major. He may go higher.

G. I. VINCENT, engineer for the gas department of the Syracuse, N. Y., Lighting Company, is now serving the United States Government in carrying into effect War Department plans for recovering toluol from gas manufactured at many lighting plants throughout the country.

E. E. LUNGREN, formerly superintendent of distribution of the Western United Gas & Electric Company, of Aurora, Ill., has begun training for a commission in the Aviation Section, U. S. Signal Officers Reserve Corps,

at Champaign, Ill. J. H. Gumz is serving as acting superintendent of distribution.

PAUL D. REID, who was formerly connected with the Atlanta Gas Light Company, of Atlanta, Ga., and who has been with the National Army at Camp Gordon, has proved his exceptional ability as one fitted for military work. He has been appointed regimental sergeant-major, which is the highest of all non-commissioned officers, and has received his chevrons.

THE NEW ORLEANS RAILWAY & LIGHT COMPANY, of New Orleans, La., in the November number of *Energy* published the following Roll of Honor of the men from the company who had enlisted in the United States service:

Capt. S. F. Simpson, Navy, Auditing Department.
Chester Brown, Navy, Auditing Department.
Sergeant M. Block, Artillery, Auditing Department.
M. Garrot, Artillery, Auditing Department.
R. L. Larue, Artillery, Auditing Department.
Galin Guillot, Artillery, Auditing Department.
Wm. Tallant, Infantry, Auditing Department.
I. McCune, Infantry, Auditing Department.
L. Melloz, Infantry, Distribution Department.
J. Webb, Infantry, Distribution Department.
L. Jones, Infantry, Distribution Department.
James Wagner, Infantry, Distribution Department.
Benjamin Bellac, Infantry, Engineering Department.
Albert Enos, Infantry, Engineering Department.
Thos. McKernan, Infantry, Engineering Department.
Peter Pagnac, Infantry, Transportation Department.
I. W. Storkey, Infantry, Transportation Department.
A. Legnon, Navy, Transportation Department.
R. Boudro, Navy, Transportation Department.
S. Thibodaux, Navy, Transportation Department.
A. Maurin, Hospital Corps, Treasurer's Department.
David Lawler, Navy, Commercial Electric Department.
Howard Lewis, Navy, Commercial Electric Department.
E. W. Shamp, Army, Transportation Department.
T. H. Koenig, Army, Transportation Department.
F. W. Frantz, Army, Transportation Department.
M. Marlborough, Army, Transportation Department.
H. P. Pfaefflin, Army, Transportation Department.
R. N. Gurtner, Army, Transportation Department.
L. D. Sorter, Army, Transportation Department.
L. Bourdonnay, Army, Transportation Department.
L. Decorteau, Army, Transportation Department.
G. W. Baker, Army, Transportation Department.
J. Ebert, Army, Transportation Department.
J. L. Moritz, Army, Transportation Department.
Jos. Grillot, Army, Transportation Department.
A. Schultz, Army, Transportation Department.
A. Mayol, Army, Transportation Department.
W. Mason, Navy, Transportation Department.
W. Cotag, Navy, Transportation Department.
H. Sheperd, Artillery, Transportation Department.
T. Lynch, Artillery, Transportation Department.
C. Lods, Artillery, Transportation Department.
Floyd Armond, Navy, Transportation Department.
E. Kihneman, Army, Power Department.

THE CAMBRIDGE GAS LIGHT COMPANY, of Cambridge, Mass., is flying from their building a service flag with twenty-four stars, indicating the employees in the United States service.

D. M. MOORE, who recently took the officers' training course at Fort Benjamin Harrison, Indianapolis, Ind., has been commissioned a captain. Mr. Moore was formerly connected with the Hope Natural Gas Company, at Clarksburg, W. Va. He is now located at Camp Sherman, Ohio.

C. R. BAIR, of the Chester County Gas Company, West Chester, Pa., recently left for Camp Meade. Before leaving Mr. Bair was tendered a farewell party and was the recipient of a camp outfit. The gas company employees presented him with a number of articles that he will need in the service.

W. GRIFFIN GRIBBEL, formerly with the John J. Griffin Company, of Philadelphia, Pa., is now captain of Company A, Thirtieth Engineers, Gas and Flame Service.

C. P. REX, formerly connected with the Public Service Gas Company, Summit, N. J., is now with the Ambulance Corps, Unit 33.

WARREN R. SWAIN is now corporal with the Second Pennsylvania Field Artillery, Battery F. He was formerly with the United Gas Improvement Company, Philadelphia, Pa.

RICHARD FOWLER, commercial manager of the Detroit City Gas Company, Detroit, Mich., is now captain with the Michigan State troops.

T. E. GRANT recently severed his connections with the Humphrey Company, Kalamazoo, Mich., and is now in the Officers' Reserve Corps.

HENRY L. DOHERTY & COMPANY subscribed $1,000,000 to the second Liberty Loan and another $1,000,000 was subscribed by the Cities Service Company.

THE PACIFIC GAS & ELECTRIC COMPANY, of San Francisco, Cal., employees subscribed $175,000 to the second Liberty Loan.

THE SURFACE COMBUSTION COMPANY, of Long Island City, N. Y., employees have responded to the nation's call, the following being in the national service:

C. E. Richardson, secretary, first lieutenant, Company B, Thirtieth Engineers, Gas and Flame Division.
W. B. Eddison, chief engineer, lieutenant, junior grade, Naval Reserve.
W. M. Hepburn, engineer, captain, National Guard.
G. M. Peltz, engineer, Aviation Corps.
A. L. Hollinger, engineer, private, National Army.
P. W. Rowland, engineer, Aviation Corps.
W. L. Bakelar, chief clerk, private, National Army.
O. Pritchard, machinist, National Army, Ambulance Division.
W. B. Tiebout, machinist, private, National Guard.
R. T. Palmer, draughtsman, Naval Reserve, Signal Corps.

R. T. PURCHAS, assistant purchasing agent of H. M. Byllesby & Co., has completed the land term in the U. S. Aviation Corps (Champaign, Urbana field), and has been assigned to the Mineola, Long Island, field.

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Good Will Capitalized

Many gas companies have made considerable investments in good will. We have never heard any of them express doubts as to the business judgment revealed in making such investments. It is but seldom, however, that we have a material value in this intangible asset revealed to us. The Cambridge Gas Light Company, of Cambridge, Mass., has obtained a return on its investment. Under the Massachusetts laws it can raise its rates on its own volition. The part of the regulatory commission comes later. Consumers have to protest against the increase, and, if unwarranted, the commission can order it down again. The Cambridge Company, following its recent increase, traveled this cycle. The hearing has been held and the rate set by the company still stands. The following comment from the Somerville, Mass., *Enterprise*, for Oct. 10, tells the story:

"A notable incident in connection with the hearing Monday before the Massachusetts Gas and Electric Light Commission was the fact that of thousands of consumers in Cambridge and Somerville of the products of the Cambridge Gas Light Company, only one person from Cambridge appeared to protest the recent increase from 80 to 90 cents per thousand feet for gas. No one of the legions of patrons in Somerville made any statement in opposition.

"This is a tribute to the standing of this public service corporation. The commission did not ask for general expression of opinion from the public. If it had, it would have heard from one customer, a patron for over a quarter of a century, who stated following the hearing that if evidence was desired he would have been glad to go on record as to the methods and policies of this corporation, as he had found them, as they related to employees, customers and the public, which naturally is concerned in service given by public service corporations.

"We have before commented upon the satisfaction existing among patrons of the Cambridge Gas Light Company. It has been the custom of the average person to lose no opportunity to take a fling at public service corporations on general principles; to figure that they are organized to fleece the public and that they usually succeed in getting away with it.

"This criticism has been justified in regard to some public service corporations, but it does not seem to apply to the Cambridge Gas Light Company.

"Under a conservative management, with an eye single to safeguarding all interests, stockholders, employees, customers and the public, it has a record of which it may feel proud. It has maintained a policy of open-door methods, of taking the public into its confidence, that has brought about to a not inappreciable extent practical elimination of the public demand for municipal ownership in this vicinity at least, and so prominent in this State only a few years ago.

"The commendable care with which this company gives attention to details that will conserve the public interest, reasonable wages, high-class service, promptness in making repairs, leaving streets in fit condition when excavations for new construction or repairs are

made, profit-sharing with employees; in fact, various methods employed in its business have resulted in giving it a high place in the confidence of its patrons, as shown at the hearing.

"It was just as well the hearing was held. It must have shown to the commissioners that if there were general protest over the recent conservative increase the public would have voiced its opposition. It is to be presumed that the general confidence in the policies of this corporation will be found not to have been misplaced. The public will rest content with its statement that when normal conditions return the Cambridge Gas Light Company will carry out promises made at the inauguration of the increase in July, that it will give the best class of service at prices based on prevailing economic and industrial conditions, with justice to stockholders and all cncerned."

Establishing the Engineer in the Commercial Field

It is an American characteristic not to do things by halves. And, as has been pointed out in these columns previously, the American gas industry is a true reflex of all the national characteristics.

Once it devoted itself almost exclusively to manufacturing and distributing gas. Its sale was left to take care of itself. Then came the awakening, hastened, it is true, by very threatening competition. We crowned the commercial man king and set him on a pedestal. There were none like him. His mandate was law. Worse, we judged his value by the appliances he sold, not by the gas they consumed, and continued to consume.

We started him off wrong. We did not set a proper ideal for him to aspire to. We did not, in general, work on the principle that underlies the highest type of salesmanship; that is, the principle of never selling anything that it is not to the customer's best advantage to buy.

As a consequence, while it cannot be denied that even with such crude methods we have profited ourselves to a very considerable extent, we worked more in the interests of manufacturers of appliances than we did in our own.

But we are coming around to a saner viewpoint. We are establishing appliance testing laboratories. We are recognizing more and more the relation of the engineer to the commercial branch. We will soon have free maintenance—so called—of gas-using equipment, including lighting.

Robert ff. Pierce brings out strikingly the conditions into which we had drifted in his picture of the commercial manager who believed all engineers impractical who attached more importance to the utilization of some second-hand arcs he had on hand than he did to the best interests of his customer, and who, in consequence, was responsible for the loss of a factory to electric lighting. Mr. Pierce brings this out in a paper prepared for the correspondence convention of the Illuminating Engineering Society, which is abstracted elsewhere in this issue.

It is a true picture. Distressingly true. But Mr. Pierce and his kind, by turning the searchlight of publicity on such conditions, are hastening materially the day when they will no longer exist.

An Overwhelming Advantage

The greatest part of our industrial business in the past has been obtained on the strength of but one advantage—labor saving. Under present conditions this advantage has become overwhelming.

There is nothing in the country to-day that is as essential to its welfare as labor. In industrial tasks, where the nation foots the bill, relative fuel costs mean nothing if labor can be saved.

The nation has demonstrated its ability to find dollars by finding almost seven billion in a very few months, and with the blood of its citizenry not yet fully roused. It has not, however, demonstrated its ability to find the vast hordes of labor that its needs seem to require.

An effective means of relieving this situation lies in lessening the number of laborers required. Industrial gas installations already existent have done something towards effecting this. Industrial gas installations that might be made would be of incalculable value.

But a relatively small number of industrial gas installations, considering the possibilities, are being made. In fact, various companies are not only not seeking them, but absolutely refusing them.

The reason is that these companies do not see where coal sufficient to meet their existing needs is going to come from. Naturally they are not anxious to add to their perplexities.

When the Government is actually receiving toluol from the gas industry at large these matters of coal supplies will cease entirely, regardless of who must be denied. In fact, it might be said, were we to-day generally equipped to produce toluol and actually producing it, we would not now be confronted with this deplorable situation. The needs of the armed forces predominate over everything.

But the value of industrial gas installations in the solution of the most perplexing situation the nation faces is so evident that their requirements can be argued on that basis alone. Aside from the toluol question, such installations should be encouraged and not deterred.

The question of coal supply is the only obstacle that stands in the way. Inevitably this obstacle will be removed within a very few months in the due course of events. It is imperative, however, that it should be removed promptly.

The gas industry should bring to the attention of

the coal controller the situation as it exists in the industrial fuel branch of the gas industry. Representative tasks necessary to the war-time activities of the nation that gas has been applied to should be tabulated and the percentage of labor saving effected convincingly demonstrated.

The Toluol Question—From the Other Side

"Ours is not an autocratic government, even though we are living in a day when democracies have through necessity temporarily appropriated some of the lesser vices of autocracy in order that they may protect their very lives.

"The Government has not the power at present to demand the erection of toluol recovery plants, therefore it devolves upon the gas companies to take up the work at once as a military necessity; it is the duty of the public service commissions to place as slight obstacles in their way as possible, and it is necessary that the public accept conditions as they are until we have triumphed over Kaiserism.

"Chambers of Commerce, representing the serious-minded business interests of the community, can do much to aid in this work through taking a proper attitude. The acceptance of present conditions by public-spirited organizations with high ideals is one of the greatest aids to municipal and State officials in the performance of work which might be criticised by ill-informed citizens.

"Officials who have anything to do with the regulation of gas companies must consider the toluol situation seriously; public service commissions must interpret their duties broadly and must protect the public, not by demanding the maintenance of old standards for illuminating gas, and thereby preventing immediate action, but by making as quick and as fair an adjustment of rates and standards as is possible in a brief conference, and thus permit the gas manufacturers to help the boys in their journey 'over the top.'"

These statements are not quoted from a paper read at a gas association convention. They are not reprinted from an editorial published in a gas journal. Nor, in fact, do they emanate from any source pertaining to the gas industry whatever.

They appear in the December *American City*—an illustrated review of municipal improvements and civic advance; a journal that may be said to represent the general public in a broad sense in matters such as these, and in nowise representative of the gas industry.

Yet the recommendations made are eminently fair. No gas man will dispute them in any degree. Nor will he take exception to the following:

"Can any group of men, particularly those controlling the plants where it is possible to produce the toluol for the United States armies afield, stop to quibble over the remuneration for the production of toluol when delay may mean death of their own sons within a few months? Can the public service commissions afford to check the activities of the gas companies, which are willing and ready to serve the nation by the production of toluol, and which ask only that the Government underwrite their expenses? Some commissions have explained their hesitancy on the ground that the consumer must be protected. The consumer must be willing to use a slightly inferior gas for the period of the war if it becomes necessary to reduce the heating value or the candlepower of the gas in order to increase the production of the base of T. N. T. and thus aid in reducing the length of our casualty list. This is not the time to quibble over such things. To say that all this can be arranged within a year may be a very sweeping statement, but there is little doubt that all prices and standards can be satisfactorily arranged within that time, and in the meantime *toluol must be produced*. Every single day that the recovery of toluol from every plant in this country is delayed means the loss of the equivalent of 150,000 3-in. shells. This is a mere fraction of the number necessary, as the great preparations for offensive movements are started with the use of hundreds of thousands of shells in one day."

There is a degree of understanding revealed in this journal's words that is encouraging to say the least. A more encouraging prospect is revealed when we consider that comment of similar tone has appeared quite frequently in various daily newspapers throughout the country.

The American people are rapidly getting together in the great task that is before them. They are beginning to get a clearer conception of each other's problems and good qualities. Even our pet bugaboo the capitalist and the leader of big business are coming in for a certain measure of popularity. The pinch has revealed them in their true light as pretty useful citizens; citizens, too, who, in these times of stress, are moved by the same impulse which is moving countless boys on the very threshold of life to covet the opportunity to lay down their lives—the impulse to make any sacrifice.

The gas industry seeks no profit out of the war. It seeks but one thing: the opportunity to be useful to the highest degree without imposing an unwarranted hardship on a small part of the population, those stockholders who are mainly dependent upon its reasonable earnings for their livelihood.

That it will be given the opoprtunity of being so, there cannot be the slightest doubt. That it will grasp the opportunity eagerly is equally beyond question. That the part it will play will be appreciated by the public in its true light is indicated by the recent change in the tone of public comment in many sections of the country.

Making Plans for Next Year's Gardens

The gas company cannot, like the individual, make plans to go in for gardening overnight. Thus we find that while a very large number of companies responded enthusiastically to the garden movement, many with the lands and facilities available, and the inclination, failed to do so.

The need for increased food production will be as great if not greater next summer than it was in the past summer. The cost of the necessities of life to gas company employees is likely to be just as high if not higher than it is now.

Employees of those companies which encouraged and aided gardening last summer have not felt the pinch of high prices so keenly as employees of companies which did not. Hence they have not felt so acutely the need of fabulous compensation. Those companies which helped their employees to raise their own vegetables and to regulate the prices they paid for foodstuffs have achieved to a degree an economic advantage over companies that did not. They have driven forward at least one step towards alleviating an abnormal labor problem.

Those companies which have not benefited by this advantage should plan to do so next year. Those companies which have should plan to benefit to an even greater degree.

The management which keeps constantly in mind the thought that it is not the employee who is paid a high wage in dollars alone that is necessarily the best paid, but the employee who is able to set the most aside after he has paid for his necessities, has gone a long ways towards the ideal in freeing itself from labor difficulties. If it spends one dollar to lower the cost of living of its employees to the extent of three dollars, then it has made money, for it will not be compelled to raise his wage until the cost of other items has gone beyond two dollars additional.

The gas maker is not directly a food producer. Tending strictly to his own business, he is a charge and responsibility on the food-producing part of the community. If he raises one-tenth of his own food he lessens that responsibility markedly. If every gas man did this much, in the aggregate, a tremendous burden would be taken off the food producers' shoulders. And it is a highly patriotic duty to give the food producers every lift we possibly can.

It would be to no real avail if the gas maker neglected in any part his real duties to give time to cultivating gardens. To be of help in this task he must do his gardening in his own time; in other words, add a few more half-hours to his week's work. The gas company cannot compel him to do this. It can encourage him to, however.

Two great factors combine to make its efforts successful. In planting and caring for a garden the individual knows he is performing a service to the nation. Also he knows he is performing a service to himself, for he is, in effect, making his dollars go farther.

All gas companies should look about to determine what encouragement they can give to employee gardening. Eventually they will do this as a welfare measure alone. By leaping forward a few years they can contribute materially to their own advantage and that of the nation at the same time.

Publications

Deterioration in the Heating Value of Coal During Storage

Bulletin 136 of the U. S. Bureau of Mines. Stiff-paper-bound booklet; 38 pages, illustrated. Authors, Horace C. Porter and F. K. Ovitz. Obtainable from the U. S. Bureau of Mines, Van H. Manning, director, Washington, D. C.

Much has been written of the changes undergone by coal in storage and the deterioration of coal through exposure to the weather. In order to obtain definite information for the benefit of the Government departments and of all who store coal in large quantities, a series of tests was begun in the fall of 1909 under the supervision of J. A. Holmes, then chief technologist of the United States Geological Survey, and was continued by the Bureau of Mines after its establishment in 1910. The tests were confined to determinations of the loss in heating value of the coals, and did not include a study of other deterioration; for example, in coking quality or the yield of by-products in coking. The Bureau of Yards and Docks of the Navy Department co-operated in tests of New River (W. Va.) coal, a variety largely used by the Navy. A preliminary report presenting a brief account of the early results of these tests has been published by the Bureau of Mines as Technical Paper 16.

The detailed report is presented in this bulletin, which gives a full account of the tests and the analytical data covering a period of five years' storage. Data of somewhat similar experiments for shorter periods with gas coal from the Pittsburgh bed, with Pocahontas coal on the Isthmus of Panama, and with Sheridan, Wyo., subbituminous coal, which is used for railroad and other purposes in the West, are included.

The tests of New River coal, in co-operation with the Navy Department, were undertaken to determine the advantage to be gained by storing coal under water, and particularly under salt water. Small lots were used in order to make the tests of maximum severity, and parallel experiments were made with run-of-mine and crushed coal under one-fourth inch size. All of the small lots tested under the different conditions (except those tested near Key West, Fla.) were taken as representative portions from one large original lot.

The tests of Pocahontas coal, which, like the New River, is semi-bituminous, were undertaken chiefly to determine the effect of the tropical conditions in Panama. They were made on an outdoor pile of 100 tons of run-of-mine coal.

Pittsburgh gas coal, a high-volatile, bituminous type used at gas and by-product coke works, was exposed for test at Ann Arbor, Mich., in co-operation with the University of Michigan. The university agreed to make tests at successive intervals of storage to determine, in its illuminating-gas experiment station, the yields of gas and by-products from the coal. The coal, screened lump, was stored in about 4-ton lots out of doors in open bins.

The results of the tests show that the amount of deterioration of coal in heating value during storage has been commonly overestimated. Except for the subbituminous Wyoming coal no loss was observed in outdoor weathering greater than 1.2 per cent in the first year or 2.1 per cent in two years. The Wyoming coal suffered somewhat more loss, 2 or 3 per cent in the first year and as much as 5.5 per cent in three years.

Laboratory Determination of the Explosiveness of Coal Dust and Air Mixtures

Technical Paper 141 of the U. S. Bureau of Mines, Van H. Manning, director. Paper-bound booklet; 35 pages, illustrated. Authors, J. K. Clement and J. N. Lawrence. Obtainable from the U. S. Bureau of Mines, Washington, D. C.

Two previous publications of the Bureau of Mines have been devoted to the laboratory investigations of the inflammability of coal dust. In both of these the value of a reliable laboratory method for measuring the inflammability of dusts was pointed out.

The term "inflammability" as used in this report is defined as the ease with which a flame can be produced in a cloud of dust that will travel beyond the influence of the igniting agent

Various investigators have devised a number of laboratory methods for determining relative inflammability, but with most of the methods previously described it has not been possible to distinguish between dusts that may give rise to explosions in the mine and those that will not. Such a differentiation of dusts obviously depends on the availability of data concerning the behavior of dusts under actual mining conditions as well as on the sensitiveness of the laboratory method. Data of this nature has been available only within a few years.

During the course of the investigations at the experimental mine of the Bureau of Mines it was found that dusts of too low inflammability to be ignited in the laboratory apparatus previously used by the bureau, and described in Bulletins 50 and 102, were nevertheless capable of propagating violent explosions in the mine. Consequently, it became necessary to increase the sensitiveness of the laboratory method.

The laboratory method described in the paper is capable of measuring the inflammability of the least inflammable dusts that will propagate an explosion in the mine. A relation has been established between the results of tests on a large scale at the experimental mine and the results of laboratory tests, so that it is now possible to determine from laboratory tests alone whether or not a given dust may give rise to or propagate explosions.

Normal air has been used in previous laboratory experiments with dusts. Recent work at the experimental mine has shown that dusts which in normal mine air are not capable of propagating an explosion may, in the presence of a small percentage of natural gas, readily propagate an explosion. The laboratory method has therefore been so modified that dusts may be tested in the presence of various percentages of combustible gas; and the effect of small amounts of combustible gas on the inflammability of dust has been investigated

The contents include a description of the apparatus employed and method of use; tests of typical coals at various temperatures; a discussion on the inflammability of mixtures of coal dust and shale dust and inflammability of dust in air containing small amounts of natural gas, and a tabulation of the results of inflammability tests of various coal dusts.

Coking of Illinois Coals

Bulletin 138 of the U. S. Bureau of Mines; a report prepared by F. K. Ovitz under a co-operative agreement of the U. S. Bureau of Mines with the Illinois State Geological Survey and the Department of Mining Engineering of the University of Illinois. Stiff-paper-backed booklet; 71 pages, illustrated. Obtainable from the U. S. Bureau of Mines, Washington, D. C.

The first part of this report outlines the present factors in the problem of coking Illinois coals, and points out the future prospects. The quality of coke from Illinois coals alone, and from mixtures of Illinois coals with low-volatile coals, is described, and the uses for which the coke is suitable are discussed. The gas-making properties and the value of the coals for making by-products are noted. Desirable methods of preparation of the coals, the impurities in them, and the effect of the impurities on the value of the coals for coke and gas making are considered.

The second part of the report deals with the character of Illinois coals, their nature, physical properties, and chemical composition. The non-homogeneous structure of the coal, the variation in composition of different beds, and even of the same bed in different localities are pointed out. Those districts in which the coals contain the smaller amounts of impurities are grouped together.

The last part describes the tests made and gives detailed results. The tests are considered under three classes—those with beehive ovens, those with by-product ovens, and those with gas retorts. The details are as complete as the material available permits. The results of a few tests of the coke for furnace or other use are given

In the introduction a strong plea is made for the general distillation of coal instead of using it raw as a fuel. "When coal is burned in furnaces for the generation of steam," it states, "only the heat generated by the fuel is utilized; possible by-products are not only lost, but frequently are the source of the smoke nuisance. The volatile matter containing the tar and heavy hydrocarbon gases is difficult to burn completely in many furnaces, and its decomposition produces black smoke. . . . The coke that remains after the volatile matter has been driven off is a valuable fuel that can be used for almost all purposes for which bituminous coal can be used."

Alert gas company managements in certain cities will read in the sentence "It—coke—has about the same heating value as anthracite coal" the opportunity to utilize the by-product oven. In some cities, because of smoke-elimination ordinances, great quantities of hard coal are used. Coke practically equals it in heating value. Produced as a by-product of gas manufacture, there is no reason why generally it could not be made to underbid it in price.

Merchandising Gas

Pacific Gas and Electric Shows that Appliance Sales Campaigns Can be Made to Pay Even in Economy Years

House to House Canvass Determines Number and Kind of Hard Fuel Burning Appliances Along Lines—Intelligent Salesmanship Displaces a Large Proportion of Them in Favor of Gas

ONE OF THE MANY PILES OF OLD STOVES REPLACED BY GAS RANGES DURING PACIFIC COAST CAMPAIGN

There are bound to be times when the output of gas is influenced by conditions the same as with any other commodity. Such a time was in the year 1915, when the general wave of economy had its effect on the gas sales, declared L. F. Galbraith, of the sales department of the Pacific Gas & Electric Company, in an article in *Pacific Service Magazine*. The situation from a new business standpoint warranted at that time a very careful analysis, and in certain districts of the "Pacific Service" territory where the plan was practicable a house-to-house canvass was made for the purpose of securing definite information concerning the practice of proper economy in the use of gas for domestic purposes. The fact developed that a doubtful economy was practiced by a considerable number of consumers in decreasing their use of gas in favor of hard fuels.

Saturation Point by No Means Reached

Notwithstanding the great number of gas appliances that had been sold among consumers located in the territory where this canvass was made, it was found that a large number of wood and coal ranges still remained in the kitchens. When the results of the canvass were recorded and tabulated the number appeared surprisingly large.

Obviously the course for our company's sales department to pursue was to effect the complete removal of all coal and wood ranges, or as many as possible, and their replacement with all-gas kitchens.

Intensive Effort Required

A campaign of this nature involved a vast amount of work in each individual case. In the beginning each coal stove owner had to be convinced alone. It required the highest type of salesmanship as well as unlimited persistence to induce the prospect to part with her stove. Regardless of the fact that thousands of housewives were using gas exclusively for all of their cooking operations the number of women who still believed, firmly, that certain things were better done on a coal stove than in the other way was surprising, to say the least.

The start was made, however, and from the first the progress was encouraging. Only a very few salesmen were used on the work at this time, but the results demonstrated that replacements could be made in sufficient numbers to pay. A fair allowance was made for the stoves replaced, and extremely liberal terms of purchase were given. In many homes where the coal stoves had been used for heating during the cool season, the kitchen heater, or coke burner, as it is better known, equipped with a gas kindler, supplied the want.

Results Per Man Used Satisfactory

The results from this first effort were satisfactory in the number of displacements made by each of the men engaged in the work. The amount of gas used by each individual after making the change, as

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To Be Really Effective Moving Picture Slide Advertising Must be Properly Followed Up

Theatre Program Furnishes Best Means of Accomplishing This—The Two Means However, are Complementary to Each Other

By ERNEST A. DENCH

To obtain the greatest possible results from motion picture slide advertising there must be an effective follow-up medium. You may have gotten the idea that it is quite sufficient to change your slide frequently. As a matter of fact, only half of the battle is won, for it is just like advertising in the street cars, or on the billboards, and then neglecting to take display space in the newspapers.

Newspapers Cover Too Broad a Field

The slide is not sufficient elastic to perform everything demanded of it. At the photoplay theater your slide is probably one of a dozen or more, and it is well nigh impossible to retain a vivid recollection of them all. You have got to remind the spectator and, incidentally, present the direct appeal. It may at first occur to you to use the columns of the best local newspaper in town, and while this has its good points, it nevertheless falls short of the type

of follow-up medium necessary for slide publicity.

The newspaper, as a rule, covers a town like a blanket, but the neighborhood theater, on the other hand, draws the majority of its patrons from the surrounding blocks. So if it is your desire, and I assume it is, to obtain 100 per cent returns from your investment, it is up to you to employ the house organ or program, which reaches the theater's patrons every week as regularly as clockwork.

The grave mistake some gas companies make at this stage is to forsake the slide for the house organ. It may be an economical plan on the surface, but it invariably proves disadvantageous in the long run. The slide serves to get acquainted with your consumer, who cannot possibly ignore it in the darkened hall, so you secure their attention where the printed page would probably escape their notice.

The theater program has one advantage over the slide—it reaches irregular patrons. Almost every exhibitor possesses a mailing list, and to be included on same the patron has only to hand in her name and address to the girl in the pay box. The publication is generally mailed to reach patrons on Mondays and contains the program for the current week. The more discriminating patron studies it carefully in order to ascertain whether there are pictures that he or she would like to see. If there are none, he temporarily transfers his patronage to another theater. This means that your slide is missed by some patrons, but if the house organ is interesting; that is, filled with live matter from cover to cover, including the advertisements, it will be carefully read and passed on to other members of the household. For this reason, if for no other, the movie program as an advertising medium should not be overlooked.

Differing Types of Exhibitors

There are two types of motion-picture exhibitors—those who believe in obtaining as much advertising as possible from local traders, and those who under no circumstances will carry beyond a certain amount of paid copy. The first type will probably accept a dollar per inch for his space and fill up almost the entire space with his advertisers announcements, to the exclusion of reading matter, with the possible exception of his program schedule. This kind of house organ is inefficient in that it is destined for the waste basket or the sidewalk, after a skimming of the pages.

But the exhibitor who takes an honest pride in the make-up of his house organ will ask $2 per inch, and he is quite justified in making the charge, since it allows him to hold the attention of readers with interesting stuff. He will plan his pages so that reading matter is flanked with advertisements, over which he acts as his own censor. Nothing must be out of harmony with his well-defined policy and the result is 100 per cent efficiency.

Stimulating the Reader to Action

Then, too, why not offer some inducement to photoplay patrons so that they will not give your program announcements a merely casual attention? By this I do not mean to imply that the majority do not read the theater house organ from cover to cover, but it is really remarkable what a stimulant of some kind will accomplish in the all important matter of arousing people to action.

And without a doubt the most effective stunt in this connection is the misspelled advertisement. The plan cannot be operated by a gas company without the co-operation of other advertisers, but the motion picture exhibitor will gladly take care of the details. The showman usually causes four errors in as many advertisements to be made and the correct answers are kept in a sealed envelope until the contest closes.

Each person entering the contest writes the answers on the program itself, backed up by his or her name and address, after which he or she hands it over to the pay box girl. As many correct answers are received in nine cases out of ten, the first ten correct letters opened are awarded the prizes. The winners are allowed to choose any lamp they may desire up to a certain amount, as well as make purchases with the remaining advertisers—all without cost, of course.

Motion picture exhibitors, in common with publishers in general, have felt the pinch of the increased cost of paper, ink and other printing materials. Not a few theaters that formally distributed house organs up to twenty pages now seldom issue them with more than eight pages. Some even comprise four smaller pages minus the outside advertising they formerly carried. The survival of the fittest holds good in the present case, for far too many exhibitors sold their advertising space for less than what it cost them. Because of their quantity rather than quality policy, they lacked the courage to charge more when the time came—or perhaps they knew their program was so poorly gotten up that it wasn't worth more. Anyway, the gas company should pay the increased price in the knowledge that it is worth it.

Pacific Gas & Electric Shows that Appliance Sales Campaigns Can Be Made to Pay in Economy Years

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compared with the corresponding time in the years previous, indicated that a good deal was to be gained by the work.

The following year a greater effort was made. More territory was covered and more men were used in the work. The number of sales continued to increase in a satisfactory manner, particularly in those districts where replacements had been made the previous season. A somewhat greater allowance was offered for the coal and wood stoves turned in, with the result that a better grade was being taken out and replaced with gas equipment. The results in every case were proving satisfactory to both the consumer and the company.

Greater Territory Covered

At the close of this second year's effort a summary of the results indicated that the work had been so systematized that a greater territory could be covered thoroughly and a real campaign successfully undertaken. Every call made by the salesmen had been carefully carded and an inventory of the appliances in use made. In the territories where no such record had been made work was started immediately inventorying the houses on the gas mains and a record made up for sales use. This work was carried on by the inspectors during the winter season, and in April of the current year the campaign was launched in thirteen of the districts served by the company.

The story of this campaign is told in the following results: 4098 appli-

ances were gathered for active service on mains of the company in territory supplying, in all, about 40,000 consumers. The gross amount of the sales was $111,329.98.

A tabulation of the progress was made up weekly from the district reports in which the sales made by each district and each salesman were shown together with the totals to date. The final summary of totals only is herewith shown. The Sacramento district is included in the tabulation, although it participated in the campaign during the last month only, and in the sale of water heaters exclusively.

FINAL RESULTS OF SPECIAL GAS APPLIANCE SALE FOR FIVE MONTHS ENDING AUGUST 31, 1917

District	Total Appliance	Gross Amount of Sales	Number of Consumers
Chico	146	$3,797.20	1,523
Colusa	37	1,033.08	442
Fresno	436	13,714.46	7,656
Marin	327	10,814.25	3,118
Marysville ..	96	2,948.65	2,285
Napa	214	4,840.04	1,385
Nevada	182	6,422.05	1,129
Petaluma ...	212	5,851.70	1,609
Redwood ...	409	10,851.14	5,067
Sacramento..	142	1,753.00	11,732
San Jose ...	867	22,405.35	10,165
Santa Rosa .	208	5,770.00	2,189
Vallejo	721	18,297.65	2,995
Yolo	101	2,831.40	989

Note—Does not include house-heating, industrial, hotel and restaurant business. Includes all gas appliances sold during special sale.

VALUE OF NEWSPAPER PUBLICITY

The value of newspaper advertising was effectively shown in this campaign. The time saved for the salesmen could be figured in hundreds of dollars; hours of time in explanation was saved them by telling the story through the newspapers. No attempt was made to send out closing copy—our entire efforts were confined to interest-creating space.

Practically all of the copy was illustrated by the use of halftone cuts. Complete kitchen equipment showing the range, water heater, and kitchen heater set up told the story of compact convenience to the housewife. A neat bill sticker featuring the same type of illustration and calling attention to the newspaper advertisements to appear later was sent out on each gas bill in the month preceding the campaign. These bill stickers were reproduced in the papers a few days before the advertisements appeared, with the result that within a very short time every possessor of a coal range knew that something at least as good was to be had. As one of the salesman expressed it, "They all know what I'm there for when I ring the bell."

In short, in co-operation with the publicity department a feeling of coal and wood discomfort was created through the newspapers, thus assuring us of listeners to the story of "real kitchen comfort" as told by the salesman.

OTHER PUBLICITY

A great deal of interest was shown in the window displays both by the sales force and the public. Here again the all-gas kitchen was featured, with the appliances set up in various attractive combinations, all in a way to tie in with the entire advertising scheme.

Show cards, office placards and wagon banners were used as an additional means of publicity, and it may be mentioned here that the standard of work on these as turned out by the stationery department measured up to their work on the photographs and newspaper cuts used in the newspapers.

NO DELAYS THROUGH LACK OF APPLIANCES

Reserving more than thirteen carloads of appliances placed the districts in a position that practically no delays resulted because of the lack of stoves or heaters. Practically every appliance sold was installed by our company's men. In a majority of the sales, the salesman was able to promise to have the appliances sold installed the next day.

The results of the sale in the Nevada district were a surprise to many. Here, where wood was cheap and the rate for gas comparatively high, forty all-gas kitchens resulted from the work of one salesman. The distribution of forty all-gas kitchens among consumers who, because of the extremely cold winters, had previously considered gas for auxiliary purposes only, was bound to have a stimulating effect in a town of the size. In all there were sold 182 appliances.

ALL STOVES TAKEN OUT JUNKED

The returns from all the districts showed that nearly 600 coal stoves were taken in during the drive, besides the oil stoves. Nearly 300 hot plates and old low-oven ranges were taken in and replaced with the highest grade of cabinet gas ranges.

Tons upon tons of the old stoves turned in were broken up and sold for junk, for, notwithstanding the major portion of them were in good condition, being taken from active service, our company decided that throwing this great number of stoves on the market was an injustice to the dealers, and, therefore, rejected all offers for the ranges intact.

Every district did something for the cause, and there is nothing but praise for everyone. They all put their shoulders to the wheel in one of the greatest drives ever staged by this company.

Canning and Preserving Folders Increase Sales

A 6 per cent increase in sales during 1917 has been recorded by the Freeport (Ill.) Gas Company. E. D. V. Dickey, manager of the company, attributes this in good part to the distribution of the National Commercial Gas Association Canning and Preserving folders.

Another Good Argument in Favor of Gas Ranges

Once more the efficacy of the gas range over all other forms of baking appliances for the home has been demonstrated in Chicago. In its campaign for the conservation of wheat, the Woman's Food Conservation Committee of the Illinois State Council of Defense brought eight negro cooks from the land of cotton to demonstrate in Chicago the best methods of making good old-fashioned "co'n bread," corn muffins and corn cakes. The Southern "mammies" were given the choice of any baking appliance, gas, electric or coal, and, of course, without exception, they chose the gas range. Their demonstration was given in the Boulevard Building on famous Michigan Boulevard, and was witnessed every day by thousands of housewives, most of them coming from the highest class residence sections of Chicago.

Satisfaction with New Standard Being Expresed at Chicago

Edward J. E. Ward, vice-president of the Peoples Gas Light & Coke Company, of Chicago, in a letter to

Corporation Counsel Ettelson, of the city of Chicago, reports great progress in the company's effort to eliminate all dissatisfaction growing out of the company's reduction in the B.t.u. standard of its gas, a change which was authorized by a city ordinance which also ordered decreased gas rates.

Mr. Ward's letter reports that the company has 704 men engaged in the work of receiving complaints and making the adjustments on household gas appliances. He reports also that in the first week of November complaints averaged 650 less a day than they did during the preceding two weeks and 1,450 less a day than they did during the early part of October. The reports of adjusters show that in one-eighth of the total number of complaints answered the complaint was without cause, because no adjustment was necessary. In addition it was found that in one-fifth of the total number of complaints made no adjustment was necessary—that the appliance simply needed cleaning.

Fully 5 per cent of the Peoples company's 700,000 patrons complained about the quality of gas about a month ago as the result of newspaper agitation. A thorough investigation by the city council of Chicago, however, absolved the company of all blame in this connection.

"Uses of Gas" Demonstration to be Held at Richmond, Va.

The first steps toward commercializing Richmond, Va., gas business were taken recently by the administrative board. If the demonstration planned by the board is a success, the city will greatly increase its gas business, the limit being the capacity of the plant.

Chairman John Hirschberg, of the administrative board, says there is every reason to believe the enterprise of the board will prove a success, and the result will be the solving of the fuel problem in Richmond

The board has set aside two rooms on the lower floor of the premises, 1108 Capitol Street. The building is owned by the city, so there is no rent to pay. The place will be fitted up at a small cost, all the gas appliances needed being furnished by merchants of the city who are interested in the success of the project, and the demonstration in the uses of gas will be conducted by an expert from the gas works and probably a lady assistant, who will be specially engaged. The entire cost of the demonstration, which will last a month, or possibly longer, beginning Dec. 1, is placed at $400.

Chairman Hirschberg says that with city gas selling at 80 cents a thousand feet, and with the present price of coal and wood, the use of gas as a substitute will solve the fuel problem.

New Water Heater Show Room at Philadelphia

An attractive card has recently been distributed by the Pittsburg Water Heater Company, which announces the opening of a new show room at 1204 Walnut Street, Philadelphia, Pa. A complete line of Pittsburg gas water heaters is now on display at this new office.

Massachusetts Company Explains Why Increased Price is Justified

The reasonableness of an increase in price of gas from 90 cents to 95 cents per thousand cubic feet, by the Malden & Melrose Gas Light Company, is a question at issue before the Massachusetts Gas and Electric Light Commission. Hearings have already been held before this board on a petition by consumers in Everett, who protest against the increased charge. A further hearing is set for Nov. 19.

At the recent hearing, Commissioner Schaff frankly said that in his opinion the increase is amply justified by the abnormal conditions prevailing. Commissioner Lewenberg wished to raise the whole question of the reasonableness of the former 90-cent rate, but Chairman Weed opposed the opening of this issue.

Allen Hollis, counsel for the company, pointed out that in 1905 the price was $1.20. At that time the output was about 1,250,000 cu. ft., and the investment $700,000. Now the output is about 100,000,000 cu. ft. and the total assets $3,300,000.

Formerly the gas company was managed by Charles H. Tenney & Company, Boston, the former paying the latter 2.25 per cent of its gross income, but now there is no such relation.

The Malden & Melrose Company sells about one-quarter of its output to the Suburban Gas & Electric Company, which is owned substantially by the same people. Their rate has recently been raised from 45 to 50 cents per thousand cubic feet. It was stated that the Quincy company pays 47.5 cents for its wholesale supply, and that the Newton & Watertown Gas Company pays 45 cents.

Taking up the subject of the sale of residuals, which the petition held was netting the companies large returns, Mr. Hollis pointed out that the coke produced by the company is used as a fuel for the manufacture of water gas, and very little, if any, is sold to the public. Commissioner Schaff called attention to the fact that, despite popular notion, gas companies get only about 1,000 lb. of salable coke out of a ton of coal. He held that the gas company should charge itself for the coke at the bare cost of handling it, the consumer having paid the original cost of the coal. Counsel for the company demurred, saying that the right practice is to charge for the coke at the market price, because it might otherwise have been sold to the public and thus reduced the cost of the coal gas alone.

The Malden company paid for gas oil, up to last year, about 3.4 cents a gallon. This year the cost will amount to 5.82 cents. The present local market price is about 8 cents, and the present contract is about to expire.

In April, 1915, the company contracted for 30,000 tons of coal per year for three years, the price being $4.12 for Westmoreland, delivered at the plant; but an added cost of 48 cents a ton for mining and extra freight has now to be paid, making the present price $4.60.

With respect to labor, it was stated that employees are paid 10 per cent more than last year, this increase totaling $15,700.

Taxes is another item which adds to present gas costs. The Malden & Melrose Company is paying $11,400 more in local and Federal taxes than last year.

Taken all together, it was held that the cost of manufacture would amount to 12 or 15 cents a thousand feet more than normal, particularly after the present coal contract expires. The public should help the company out on these extraordinary expenditures, it was claimed.

News of the Gas Industry

Rate Increase Effective Dec. 1 at Several Massachusetts Towns

The Worcester County Gas Light Company, of Palmer, Mass., which supplies Brookfield, West Brookfield, Warren, North Brookfield, Leicester, Monson and Palmer, announces an increase in rates that will take effect Dec. 1. For general use the new price will be $1.70 net per 1000 cu. ft. for all under 2000 ft., and $1.60 per 1000 for all over 2000 ft.; 10 cents a thousand will be added for payments delayed after the tenth of the month.

Six Illinois Public Utility Companies to Increase Capital

Six public utility companies, controlled by the Illinois Traction Company, recently filed applications with the Illinois Public Utilities Commission for permission to increase their capital stock as follows: Bloomington & Normal Railway & Light Company, $53,000 preferred stock; Urbana Light, Heat & Power Company, $35,000 common stock; Decatur Railway & Light Company, $180,000 common stock; Danville Street Railway & Light Company, $49,000 common stock; Danville, Urbana & Champaign Railway Company, $550,000 preferred stock; Urbana & Champaign Railway, Gas, & Electric Company, $32,000 common stock.

Holland, Mich., Company Increases Rates

Claiming to have no alternative except to raise the price of its commodity in order to continue the operation of its plant without loss, the Holland (Mich.) City Gas Company is serving notice on its patrons that commencing Nov. 10 the price of gas will be increased from $1 to $1.25 per 1,000 cu. ft., with the usual 10 per cent discount. Upon failure to pay the increase meters will be disconnected. The gas company, through its manager, notified the council of the increase, but the communication was not filed. The gas company franchise is operative for thirty years.

SERVICE FLAG AS DISPLAYED BY THE CONSOLIDATED GAS & ELECTRIC COMPANY, OF BALTIMORE

Sea Shore Company Must Continue Service

In a decision handed down recently refusing to permit the Sea Shore Gas Company of New Jersey to discontinue furnishing service in Sea Isle City the Public Utility Commission asserted that acceptance of special privileges and favors from the public creates consequential obligations upon the recipient. Hence, although operating at a loss, the company is required by the decision to continue supplying gas to its patrons.

In support of its refusal to permit the company to abandon its franchise, the board held that the company had not exhausted the means at its command to overcome its financial difficulty. About two years ago the company asked permission to increase its rates from $1.25 to $1.75 a thousand feet. The board held at that time that the rate of $1.75 was too high, but permitted a rise to $1.50. Since that time the company has made no further application to increase rates, and the intimation in the board's opinion is that in failing to do so, because of changed conditions, it has not taken full advantage of its opportunities.

The War-Savings Plan

The war-savings plan provided for in the bond act of Sept. 24 goes into operation Monday, Dec. 3. Government certificates of indebtedness are to be sold in two denominations—thrift stamps costing 25 cents each and war-savings stamps costing from $4.12 to $4.23, according to date of purchase.

When $4 worth of thrift stamps are obtained a war-savings stamp can be secured in exchange for them by paying the difference between $4 and the current price of the war-savings stamp.

War-savings stamps can be purchased for $4.12 during the months of December, 1917, and January, 1918, but will cost 1 cent more each succeeding month in the year 1918. They are redeemable on Jan. 1, 1923, for $5, which amounts to 4 per cent on the amount invested compounded quarterly.

Although these investments do not mature until Jan. 1, 1923, on ten days' written notice after Jan. 1, 1918, such certificates will be redeemed by postmasters at their cost to the purchaser plus 1 cent a month on each war-savings stamp. The thrift stamps do not bear interest.

The stamps and certificates can be obtained from post offices, banks, or trust companies, at most railroad stations, stores, factories and many other public places.

Santa Rosa, Cal., Rate Hearing Set for Dec. 5

The application of the Pacific Gas & Electric Company to the Railroad Commission of California for permission to increase its rates for gas, will be heard publicly at the court house in Santa Rosa Wednesday, Dec. 5. Commissioners Edgerton and Devlin will sit in the case, and any citizen who has anything to offer will be heard at the time and place mentioned.

This hearing will affect the communities of Cotati, Santa Rosa, Sebastopol and suburban territory. At Petaluma a similar hearing will be held in the city hall on the day previous to the date set for Santa Rosa.

Chicago Aldermanic Committee Sees the Light and Co-operates

Adversity is the mother of co-operation.

This was strikingly illustrated last week at Chicago and Washington, D. C. In the Windy City the City Council, at the instigation of Special Attorney Richberg, who represents the city in gas matters, was conducting an inquiry to ascertain whether the Peoples Gas Light & Coke Company was fulfilling to the letter the terms of the complex and complicated gas ordinance recently passed in Chicago.

Mr. Richberg and Alderman Lynch, chairman of the oil, gas and electric light committee of the council, who were conducting the hearing, and a section of the daily press clamored for the gas company's scalp. Mr. Richberg gave out interviews saying that the gas company ought to be fined about $10,000 a day for every day in October. An alderman declared that his gas range "exploded" every time he tried to light a burner, and the city's gas "experts" told how they had found the gas in one instance 11.76 candlepower instead of 12, as required by the ordinance (although in other sections of the city it was 13 or more candlepower).

Several of the gas company's officers appeared before the council committee and stated their case, and after several days of consideration the company was absolved of all charges of violation of the ordinance. But Mr. Richberg and others continued to demand that the company be fined $10,000 per day.

The investigation over and the gas company freed of all blame, Boetius H. Sullivan, attorney for the company, announced that his client had on hand only sufficient coal to operate its plants about forty days, that there was no prospect of obtaining the amount of coal and coke needed, and that unless something was done quickly to assure the company of a greater coal supply Chicago would be without gas, and therefore without heat and light and fuel, by the middle of next month. About the same time President Cowdery of the Peoples company returned from Washington, where he had conferred with Fuel Administrator Garfield, and announced that even with the assurances made by the fuel administrator the company would not be able to meet the demand for gas this winter because of the lack of coal and coke with which to manufacture it.

He also gave the order that no more gas heating or power appliances be sold from the company's offices until the present coal and coke shortage is relieved.

Immediately Mr. Richberg quit talking of fining the Peoples company $10,000 a day. The City Council quit investigating, and instead appointed Alderman Lynch chairman of a committee to go to the national capital in an effort to secure assurance of more fuel for the Peoples company. Accordingly the committee, accompanied by John E. Williams, State fuel administrator of Illinois, appeared before Mr. Garfield in Washington on Oct. 27 and asked that special measures be taken to insure coal and coke in sufficient quantities for the Peoples Gas Light & Coke Company so that its 700,000 patrons in Chicago would have heat, light and fuel gas this winter.

Information received in Chicago before the return of the aldermanic committee was to the effect that Fuel Administrator Garfield promised the committee he would give the Chicago situation his immediate attention and would do everything possible to give the city and the gas company an adequate supply of coal.

West Virginia Exports 71.4 Per Cent of Its Natural Gas to Surrounding States

Of 291,252,435,000 cu. ft. of gas produced in West Virginia during the year ended June 30, 1917, 210,321,226,000 cu. ft., or 71.4 per cent of the total production, was exported from the State, leaving only 28.6 per cent for West Virginia consumers, according to the official report just issued by A. R. Shepherd, chief inspector of the public service commission. The average number of wells in use per month during the year was 6,682, the report shows.

New York Company Buys Coal Mines

To insure coal to fill its contract with the Empire Gas & Electric Company, of Geneva, N. Y., which supplies gas for central New York cities, the Empire Coke Company, it is announced, has bought two mines at Punxsutawney, Pa.

Reasonableness of Rate Increase to be Investigated at Six Washington Cities

Letters were sent by the State Public Service Commission of Washington to the mayors of Tacoma, Everett, Snohomish, Monroe, Puyallup and Olympia, announcing that the State proposes to investigate the books and records of the gas companies serving those communities to determine whether the companies are entitled to increase their gas rates, abolish the minimum charge and substitute a straight 25-cents-a-month "ready to serve" charge. The mayors of these communities are asked by the commission to have experts ready to co-operate with the State experts, who have begun their work. The commission plans to be able to make a report prior to Dec. 1, the date fixed by the companies for the new charges going into effect.

Following the protest that was created by the commission's ruling in the Seattle gas rate case, permitting the new charges to go into effect and postponing the hearing until Jan. 2, 1918, the commission proposes to head off such a storm in regard to the other cities involved. Without waiting for formal complaints, the commission has decided to investigate the reasonableness of the charges on its own account, and therefore the letters to the mayors have been sent out.

Discount to Be Dropped at Newport, R. I., After Dec. 1

An increase of 10 cents per thousand cubic feet of gas will be made on and after Dec. 1 in the city of Newport, R. I., according to a new tariff filed recently by the Newport Gas Light Company with the Public Utilities Commission. The new rates apply to wholesale and retail metered service, as well as the prepayment

No change is made in the present gross rates for gas by the company in its new tariff, but the increase comes in a reduction of the discount allowed for bills paid within the ten-day limit after the bill is rendered.

The discount on regular metered service will be 10 per cent instead of 20 per cent from the gross rate of $1.20. The wholesale discount on the $1.20 rate is to be 20 cents instead of 30 cents. The same discount of 2½ per cent will be allowed on each 5,000 cu. ft. or more used during each year.

Device Demonstrates Heating Properties of Purification Material

A very interesting and ingenious apparatus is being used by the Connelly Iron Sponge & Governor Company to test out and demonstrate the heating properties of various purification material, such as iron mass, etc.

It consists of two cylinders A and B of about 2-quart capacity connected at the base by a close nipple, as shown in illustration. There is an inlet connection C in the upper part of A and an outlet connection in the upper part B. Cylinder B is jacketed with ½-inch lining of hair felt to reduce heat radiation; 2½-inch holes in the top of each cylinder are used for filling the cylinders and are made tight by large rubber stoppers through which pass thermometers. The inlet C is so arranged that it can easily be connected to a gas supply or to the atomizer E, which is used as a hand bellows.

A is filled with wood shavings to remove tar and water. B is filled with oxide to be tested. Crude gas is admitted at C and passes through A and B until the purification material is fouled. When the bellows E is connected at C and air is slowly passed through the apparatus, the thermometer will indicate the heating up of the oxide by revivification "in situ." Air is slowly passed through the apparatus, and in about fifteen minutes the maximum temperature is reached.

In this experimental way tests run on Standard Iron Sponge and precipitated iron mass will show that the Standard Iron Sponge will heat about 50 deg. Fahr. higher than the precipitated iron mass.

In actual practice this difference in temperature will be considerably greater, due to the larger mass with less radiating heat losses.

With the present labor shortage, which will grow worse as the war continues, gas works superintendents are having more difficulty than ever in getting purifier boxes changed. The revivification of oxide "in situ" seems the best solution to this problem, as oxide which is properly kept free from tar will not have to be removed from a box until it is ready to be discarded entirely. The extent to which this precaution can be carried out successfully depends almost entirely upon the heating up of the purification material in question.

More Pacific Coast Hearings

In the matter of the application of the Pacific Gas & Electric Company for an order from the railroad commission authorizing the applicant to increase its rates and charges for gas furnished to its consumers in certain districts, a hearing will be held at the Yuba County courthouse in Marysville on Friday, Dec. 14, at 10 a. m. The territory affected includes Marysville, Yuba City and suburban territory.

Meetings will be held at Grass Valley on Dec. 10, at Colusa Dec. 11, Chico on Dec. 12 and Oroville Dec. 13.

Hearing on the same company's application to raise rates in Fresno and suburban districts will also be held at the Fresno, Cal., courthouse Jan. 8.

Gulf Producing Company Strikes Another Well on Aldrich Dome

The second gas well on the Aldrich Dome in Shades Valley was brought in recently by the Gulf Producing Company of Alabama, which began drilling this well about two weeks ago, shortly after successfully drilling well No. 1 on the same dome. The second well is a short distance from the first one, and while no test measurement has yet been made of its flow of gas, C. A. Owens, chairman of the board of the Gulf Producing Company, stated that the capacity was as large, if not larger, than that of the first well. The capacity of well No. 1 measured about 500,000 cu. ft. per day.

With the second well producing gas, the total output of the two wells is over 1,000,000 cu. ft. per day, or two-thirds as much gas as now used under ordinary conditions by the city of Birmingham. The second well was struck at approximately the same depth as the first one. The company is now planning to start the drilling of three additional wells and plans to have an output in the Aldrich field of 2,500,000 cu. ft. by Christmas.

Mr. Owens also stated that three additional drilling machines will be in operation on the dome shortly, two of the machines now being in place and the third will be put up as soon as water and gas connections for drilling purposes can be put in. All of the new wells will be located practically in line with the two wells now in operation.

Natural Gas Company Denied Readiness-to-Serve Charge

In a decision recently agreed upon the State Public Utilities Commission held that the Northeastern Ohio Natural Gas Company may not exact from its customers a readiness-to-serve charge of 35 cents a month for each customer, as proposed in a schedule recently filed.

The company supplies consumers in Toledo and the new schedule was proposed to increase the revenues of the company. It would have added $285,000 a year.

The commission's position was that it had no means of passing upon the adequacy of the company's returns in revenues from its operations, since the entire matter of rates and service was not before it.

Enter the Coal Card. Exit the Coal-Hoarder.

As the result of reports by coal dealers that small householders have been discovered hoarding coal, Fuel Administrator Williams of Illinois has put into use in Chicago a coal card which is counted upon to eliminate the possibility of such hoarding. The card which bears the name of the dealer and the date of sale requires the purchaser of coal to fill out the following form:

1. Amount of coal desired.....
2. Kind used last year.....
3. Approximate amount used last year.....
4. Pounds or tons on hand at present.....
5. Will last approximately ... days.
6. Have you any unfilled orders with other dealers.....?

I hereby certify that the above report is true to the best of my knowledge and belief.

Name .....
Address .....

Dealers are held responsible for the truth of statements on the cards, and they are instructed to refuse to sell when there are indications of hoarding. The Council of Defense reserves the right of an independent investigation, and penalties are provided for dealers and consumers if there is evidence of collusion.

Societies and Associations

THE OLD COLONY GAS COMPANY, East Braintree, Mass., employees held the first meeting of the season in the conference room of the office building, Friday evening, Nov. 16. The meeting was opened by the chairman, James Connors. There were a few interesting remarks by George P. Smith, Jr., manager of the company, who presented the employees with a service flag made by Mrs. H. B. Hall, wife of H. B. Hall, office manager. The speaker of the evening was Lieut. F. H. Wright, executive officer at the U. S. Naval Training Station, Bingham, Mass. After the close of Lieutenant Wright's talk there was a pleasing entertainment, after which refreshments were served. The meeting adjourned at 10.45 p. m., everybody having enjoyed a pleasant evening.

Construction Notes

Improvements to be Made by Americus, Ga., Company

The Americus Lighting Company will start at an early date on plans for improving the gas service in Americus.

Larger mains will be laid, and important improvements will be made in the plant.

When the new equipment is installed it is believed that Americus will be more than satisfied with the gas service.

Southern Gas Company to Drill New Test Well

Southern Gas Company operating on two leases near the White Point (Tex.) field are preparing to begin operations on a new test 4 miles south of Taft, and the derrick and machinery are in readiness to go to work as soon as the company can complete the laying of a gas line from their No. 1 well to the new location. Officials of the company state that the construction of this fuel line to their new location, which runs in the direction of Taft, probably gave rise to the rumor that they were preparing to furnish gas for fuel purposes to the Taft Packing plant.

C. L. Witherspoon is preparing to begin operations on the Clarence Kirk lease, 7 miles west of Portland, and has announced that if successful as expected he will make to the city council a proposal to furnish gas to Corpus Christi in wholesale quantities and the city could sell the gas direct to consumers by acquiring mains and plant of the Corpus Christi Gas Company.

Plant Now Operating With Borrowed Coal

The Warsaw (Ind.) Gas Light Company is now operating with coal borrowed of the Winona Electric Light & Water Company. The gas company's coal supply was exhausted and but for the relief given by the other public utility would have been forced to close. The matter has been taken up with the Indiana Public Service Commission and has been referred by that body to the Federal fuel administrator. Through the efforts of the Federal authorities a shipment of eight cars has been started to Warsaw from West Virginia.

New England Company Purchases Coal Tract

The New England Fuel & Transportation Company, a subsidiary of the Massachusetts Gas Company, has purchased a coal tract in West Virginia embracing 10,400 acres of the Pittsburgh and Sewickley veins. The property is the Davis-Elkins coal tract, lying along the Monongahela River in Marion and Monongahela Counties, and was purchased from the Empire Coal & Coke Company. Preliminary papers have been signed, but the deal is not expected to be completed until later in the month. It is understood that the amount involved in the transaction is about $4,000,000.

Financial Notes

THE PORTLAND GAS & COKE COMPANY, of Portland, Ore., reports that on account of an increase of 26 per cent in operating expenses during the month of September as compared with the same month of the previous year, their showing was less favorable than for several months past. Gross earnings for the month were $119,021, as compared with $110,549 for the previous September, the increase amounting only to 7 per cent. Operating expenses of the month, however, were $64,566, as compared with $51,020 in September, 1916. The net income was only $54,455, as compared with $59,509 the previous year, the decline amounting to 8 per cent. The balance also shows a decrease of from $32,204 in 1916 to $26,471 in September, 1917. For the year ending September 30, gross earnings were $1,262,517, increasing 5 per cent over the previous fiscal year. Operating expenses increased 10 per cent, and net earnings were about the same as during the previous period.

THE PLOW CITY OIL & GAS COMPANY, of Moline, Ill., has filed an application for incorporation with Secretary of State Emmerson of Illinois. Capital stock is listed as $50,000, and the incorporators are William A. Meese, Peter R. Ingelson and Stephen J. Barenthin.